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analog

A Calendar of Upcoming Events

September 30-October 5, 1974:
Space Stations, Present and Future (25th International Astronautical Congress of the IAF), Amsterdam, Netherlands. Info: IAF, 250 Rue Saint-Jacques, 75005 Paris, France.

October 6-October 11, 1974:
Planetarium Conference (International Society of Planetarium Educators) in Atlanta, Georgia. Info: J. Burgess, ISPE Program Chairman, Fernbank Science Center, Division C, 156 Heaton Park Drive NE, Atlanta, Georgia 30307.

October 10-October 11, 1974:
Lunar Dynamics and Selenodesy Conference, Columbus, Ohio. Info: American Geophysical Union, 1707 L Street NW, Washington, DC 20036.

October 26-October 27, 1974:
MILEHICON VI (Denver Area SF Conference), Sheraton Airport Inn, Denver, Colorado. Registration, $3. Info: Ted Peak, 1556 Detroit St., 1, Denver, Colorado 80206.

October 28-November 1, 1974:
The Study of Comets (COSPAR), Greenbelt, Maryland. Info: B. Donn, IAU Colloquium 25, Goddard SFC, Greenbelt, Maryland 20771.

October 30-November 1, 1974:
Conference on Scientific Experiments of Project Skylab (AIAA, AGU, and NASA), Huntsville, Alabama. Info: E. Stuhlinger, AD-S, NASA Marshall SFC, Huntsville, Alabama 35812.

October 31, 1974:
Deadline for entries in the New England SF Association science fiction short story contest. Limited to residents of New England and NESFA members. Info: NESFA, Box G, MIT Branch, Cambridge, Massachusetts 02139.

—ANTHONY R. LEWIS

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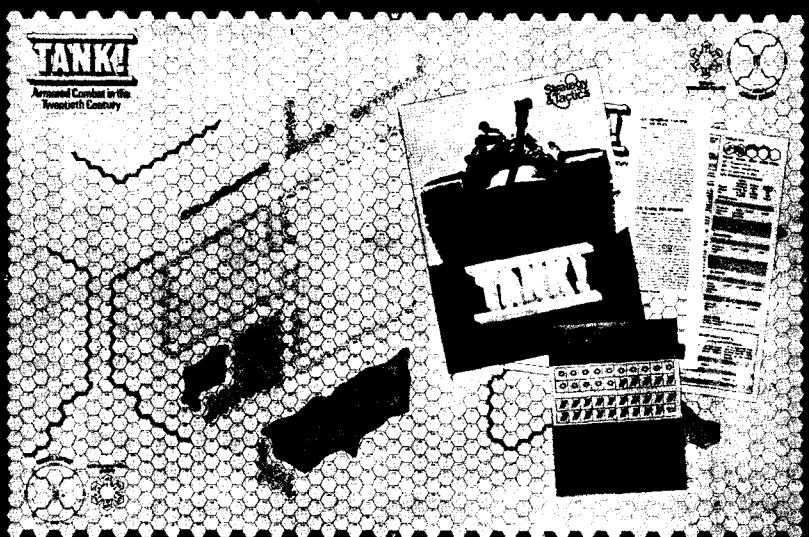

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the whole TRUTH

editorial

This is a special issue of Analog. It is devoted to an examination of the very vocal and vehement argument that has been raging for years between the scientific "establishment" and unorthodox theorists such as Immanuel Velikovsky.

The Velikovsky controversy has been echoing through the scholarly world since 1950. There is no need to go into the historical details here; Frederic B. Jueneman does a concise job of that in his article, as well as reporting on the special Velikovsky session at this year's annual meeting of the American Association for the Advancement of Science (AAAS). Isaac Asimov presents a strong and forceful argument from the other side of the fence, giving the reasons why scientists are suspicious of those who claim they're being persecuted by the "establishment." Much of the fiction in this issue, as well, deals with themes that revolve around questions of truth and the right to inquire.

Both the strongest supporters and the most determined attackers of Velikovsky claim that they are seeking the truth. Fine. But how does one find the truth? The only way I know is to examine the available facts. And if the available facts are not sufficient to decide the issue, then more facts must be found. For if the truth will enlighten us, it is only *the whole truth* that will turn the trick.

Half-truths, misinformation, emotional appeals and stinging personal attacks will not shed much light on the actual behavior of the Solar System during Biblical times. Nor can scientific questions be settled by popular vote.

For a moment or two, let's put the Velikovsky controversy aside to examine a more recent phonemenon, one that shows very clearly how half-truths can confuse the search for understanding.

Over the past few years, a series of enormously popular books have dealt with the possibility that extraterrestrial astronauts visited our planet centuries ago and either built, or caused to be built, monumental works of architecture and decoration. The first best-seller among these books was Erich von

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Däniken's "Chariots of the Gods?" There has been a flood of imitative books on the newsstands, each with the same basic format: aliens from outer space are responsible for the Pyramids, the statues on Easter Island, the intricate patterns laid out across Peru's remote Nazca plain, et cetera.

Von Däniken and his followers were not the first outside of science fiction to raise this question. As early as 1964, astronomers I. S. Shklovsky and Carl Sagan considered this matter in their book, "Intelligent Life in the Universe." But where the Russian and American astronomers showed the available evidence (admittedly hazy) and simply raised the question of extraterrestrial visitors, the von Däniken technique is to stress the strangeness and wonder of ancient artworks and architecture—and then insist that primitive humans could not have produced them without the guiding genius of intelligent alien astronauts.

The "Chariots of the Gods" approach is to say that since no one knows how the statues on Easter Island were transported from the quarries where they were sculpted to the beaches where they now stand, we must conclude that alien astronauts were responsible for the work. The patterns on the Nazca plain suggest an airport runway; the Pyramids are too massive for early Egyptian technology to produce; no one could have produced the Indian ground patterns of birds, spiders, and monkeys unless they could see the patterns from the air—or from orbit.

That is simply not the whole truth.

Thor Heyerdahl, of "Kon-Tiki" fame, found that the living natives of Easter Island can and do move the enigmatic statues. It takes some muscle and some brains, no interstellar technology. The patterns drawn on the Nazca plain and elsewhere can be done with nothing more than sticks, rope, and rocks; there's no need for an airborne observer to supervise the work. Nor is there any reason for alien astronauts to use representations of terrestrial animals as signposts to their incoming aerial traffic. Egyptologists have known for more than a century how the pyramids were built—mainly by a lot of straining, sweating workers who were encouraged by men with whips.

By using the same technique of being absolutely truthful except that I don't reveal the whole truth, I can make a good case for the proposition that Manhattan was built by alien astronauts.

After all, the island is jammed with buildings that are packed together more densely than just about anywhere else in the world. That in itself is unusual. Then, in the middle of all this architecture, is a large open area (called Central Park) *that is perfectly rectangular!*

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How could the builders of this park have squared it off so neatly unless they could observe it from the air—or from orbit? Why would they want a rectangular park? What is the significance of the strangely-shaped bodies of water spotted here and there inside the park? Why is the whole island criss-crossed by a grid pattern of streets, many of which are aligned north-south, which is very close to the alignment of the Earth's magnetic field?

There's more. In New York Harbor, very close to mysterious Manhattan, there is a huge copper statue that has been there long enough to acquire a patina of greenish oxidation. Of the many millions of people who live and work in Manhattan, no one could build that statue today! Obviously it was built by creatures who had more knowledge than Manhattan's current inhabitants.

There are many other facts that hint at Manhattan's extraterrestrial origins: the skyscrapers themselves point toward other worlds; the mysterious caverns beneath the city's streets, carved out of solid rock; everywhere you look there are hints of the island's origins.

All of that wacky description is perfectly true, but it's not the whole truth. And the difference between truth and half-truth is akin to the difference between being half-dead and being dead.

Those who see vast holes in the von Däniken type of hypothesis tend to tar Velikovsky with the same brush. Which is an unfortunate circumstance, because Velikovsky has worked hard and painstakingly to build up a body of evidence supporting his "Worlds in Collision" thesis. If there are half-truths in Velikovsky's work, it is because no one has been able to determine what the entire truth of the situation might be. There is no question of fraud, or of winking at known facts, in Velikovsky's case.

In the quarter-century since Velikovsky's unorthodox ideas burst on the intellectual scene, there has been much more heat than light generated by the fierce debates over his ideas. Apparently the same sorry phenomenon repeated itself at the recent AAAS meeting. This was unfortunate, for in the furor of that special session Carl Sagan delivered a detailed and serious critique of Velikovsky's main arguments. Instead of yelling that Velikovsky just didn't know anything about astronomy, Sagan used the same techniques of sober analysis and questioning that a scientist uses on any set of theoretical ideas.

The major thrust of Velikovsky's thesis is that a series of interplanetary near-collisions caused many of the miraculous events described in the Old Testament. The planet Jupiter ejected a comet-like body that finally settled into a planetary orbit about the Sun; we know that body today as the planet

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Venus. Between the ejection from Jupiter and the final assumption of a nearly-circular planetary orbit, both Venus and Mars passed very close to Earth. In addition to gravitational effects that literally shook the worlds, Velikovsky posits that electromagnetic forces also caused interactions among the planets, and strongly affected the rate of the Earth's axial spin.

Sagan asks a number of crucial questions, in an effort to find whether available astronomical evidence supports or denies Velikovsky's theory.

For example, he asks if there is any evidence of major collisions or near-collisions in the Solar System over the past 3,500 years. There is plenty of evidence of collisions taking place billions of years ago: the faces of the Moon, Mars and Mercury show that. But there is no evidence of more recent major hits—or near-misses. Indeed, the orbits of the planets are enormously stable, and it would take titanic amounts of energy to move a planet out of (or into!) its current orbit.

Is there evidence that the Earth's rotation has slowed or speeded abruptly in the past three or four millennia? Coral growth rings, which accurately show the number of days per month and per year for many millennia into the past, show no such excursion.

If Jupiter ejected a planetary-sized body, the energy involved in doing this would inevitably have

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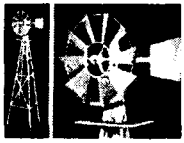

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raised the temperature of the body beyond the melting point of rock. It is unlikely that a molten planet would cool down to Venus's present—and admittedly high—temperature over a scant three millennia.

And the total energy needed to move Venus out of Jupiter is equivalent to the amount of energy radiated by the Sun in a year. Where did this energy come from?

If a close encounter with another planet stopped Earth's rotation temporarily, how did we start spinning again? And how did our spin rate go back to the twenty-four hours (approximately) that it was before the spin was stopped?

If the Earth was subjected to enormously powerful electromagnetic forces during this turbulent time, why is there no record of it in the fossil magnetization of Earth's rocks? And how can these titanic electromagnetic interactions come from Venus and/or Mars, which have vanishingly small magnetic fields? Our own geomagnetic field of about 0.5 gauss is much too weak to produce interplanetary thunderbolts.

If Venus originated in Jupiter, why are the atmospheres of the two planets so different? The atmosphere of Venus is almost pure carbon dioxide, which could not exist in Jupiter's strongly reducing atmosphere of hydrogen and hydrogen compounds.

Velikovsky's theories claim that Venus's atmosphere must be rich in carbohydrates. There is no evidence for carbohydrates in Venus's atmosphere. Carbon dioxide, yes. There was thought to be some evidence for hydrocarbons, but even that is in doubt now. And hydrocarbons are about as close to carbohydrates as crank case oil is to Danish pastry.

Velikovsky did predict that Venus's surface temperature would be much higher than most orthodox astronomers believed in 1950. But ten years earlier, the dean of planetary astronomers, Rupert Wildt, suggested that Venus's surface temperature would be much hotter than existing theories showed, because its carbon-dioxide-rich atmosphere would create a huge greenhouse effect. The two men came to the same conclusion, but for different reasons. Today, spacecraft measurements have confirmed Venus's high temperature and its CO_2 atmosphere.

Venus and Mars radiate more energy than they receive from the Sun, according to Velikovsky. This is not so, according to the most delicate measurements made to date. Jupiter *does* radiate more energy than it gets from the Sun, but Velikovsky never mentions this.

Velikovsky also predicted that Jupiter would be the site of strong electromagnetic forces, and this is correct. The giant planet is surrounded by a giant Van Allen belt, and radio astronomers find Jupiter the strongest source of radio emission in the Solar System (except for solar flares).

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On the other hand, Robert W. Bass, professor of physics and astronomy at Brigham Young University, has published mathematical analyses challenging the widely-held belief that the orbits of the Solar System's planets are unalterably stable.

Bass's work has led him to the conclusion that relatively small disturbances in the orbits of the planets could lead to major changes in their motions, changes wild enough to account for the types of near-collisions among the inner planets that the Velikovsky hypothesis requires. Corroborative computer analyses are now underway to define what initial conditions could lead to what Bass himself refers to as a "cosmic billiard shot."

The basic point that Bass makes is that there is no fundamental reason stemming from celestial mechanics that "forbids" a Velikovskian shuffling of the orbits of Venus, Mars and Earth within Biblical times.

Where does that leave us?

Assuming that both Sagan and Velikovsky have conscientiously sought to bring out all the facts that they have at their command, without half-truths or evasions (a safe assumption on both sides, I believe), it would seem to be Velikovsky's turn to refute Sagan's analysis with evidence that shows where Sagan is wrong. If both men are seeking the truth, both should be glad to find what the truth is—no matter how their differences are ultimately resolved.

To my mind, the weight of available evidence is decidedly against Velikovsky. But perhaps he can change this balance. If he can prove his thesis, it will show that we have a lot more to learn about the nature of our universe than we thought we did. And ignorance is neither blissful nor desirable. If we live in a Velikovskian universe, we'd damned well better find out about it as soon as we can.

But even if Velikovsky is entirely wrong, and it's a Copernican-Newtonian-Einsteinian universe after all, this entire controversy has been rewarding in its own right.

It is important, it is *necessary,* for us to question our own assumptions and certainties. Not just about science, but about every aspect of human thought. Nothing is as dangerous as complacency, for it leads to ignorance and intolerance. If for no other reason than that he has forced us to re-examine our thinking, Velikovsky has performed a vital service for us all.

For if war is too important to be left to the generals, and politics turn sour when they're hidden from the light of public scrutiny, it is equally important for the basic issues of scientific thought to be open to public view. If the truth will make us free, it has to be the whole truth. No matter how painful that might be, or to whom.

THE EDITOR

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Dis Buk wil tel dē storē of dē Burning, and of whī
Each 80 yērs Men hav to hīd from Wind and Sē and Skī.
And how dē first Men first went Nōrd to flē dē Burning Sun,
And whī God rids dē Wrld of Līf when Līf has jus begun.
—Godbuk 1, 1, 1-4

Lars Martin had been assigned the unpopular job of auditor. He sat under an awning on the dock, beside a balance-scale taken from the market. He had stacks of watertight bags made from fish bladders and a notebook that contained a roster of the town's population. One pan of the balance held two fist-sized weights, and in the other pan a family would place such personal possessions as they wished to take with them on the northern mi-

JACK GAUGHAN

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truth to tell

In the country of the blind, of what worth is a one-eyed man?

JOE HALDEMAN

gration. The two weights that limited their allotment totaled less than twenty pounds, so family members argued quite a bit with each other, and everybody argued with Lars.

Lars was normally the town's book-keeper (a word with a very literal meaning there) and had very legible handwriting as well as a facility for arithmetic, so he was the logical choice for the post. But he was also a charitable man, and it pained him to be inflexible with his friends. A collection of discarded treasures grew at his side: dolls and fine clothes, pictures and sets of dishes and tableware, jewelry and even coins. And books, which hurt Lars the most. He had written most of them.

"Still a little light, Fred." Fred

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had no family, but was allowed the full weight. "Why don't you take one of these?" Lars had salvaged books from the discards and lined them up neatly on his table.

"I've read most of them," he said. He picked up the town's copy of "Metal Work." "This one, I even have in my memory."

Lars stirred the pile of coins and ingots that made up all of Fred's allowance. "When we come back, they'll be worth more than gold and silver."

"You say that to everybody." Fred laughed humorlessly. "I know how you feel. Some of my best work is going under, too."

"It's a different thing," Lars said, tired of everybody's obtuseness. "You can make them again, after."

"You can write the books down again."

"Two or three of them, I could," he admitted. "For the rest . . . I'll mine your memory for metalwork, and old Johansen's for history, and the like. And borrow books from other towns. When there's money for it. If they have any books to borrow."

"We've always managed."

"I don't think so, Fred. We lose a certain number of books every Burning."

He shrugged. "Is that bad? We only lose the ones that nobody has put in his memory. If only the best survive, I don't count that as a loss."

Fred was partly being honest, Lars knew, but was also setting him up for a joke. Lars taught numbers and letters to all the town's children, and knew that he sometimes treated the adults as children, out of habit or absent-mindedness, when there was something to be explained. Catching him at this was considered high humor.

Maybe it was "frontier" humor, but that particular word had long disappeared from their language. Exploration was a luxury their race couldn't afford, spending every fourth generation preparing for planetary disaster. Then three generations trying to recover.

They called their planet "the world," and the double star system in which it orbited, they called "the suns." The brighter of the two stars provided the Burning by flaring up every eighty-three years.

But their remote ancestors, some two thousand years before, had named the planet Thursday's Child, when they had come out of blind-space thoroughly lost, their colonizing vessel crippled and its resources so depleted that the ship's elders had set up a roster for systematic cannibalism. From orbit, Thursday's Child had seemed an incredible miracle: a frost-capped globe of greens and warm browns and glittering blue. They landed and found that the soil took their seeds and cuttings well, and the sea teemed with a great variety of life. But the only land animals were a

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few hardy varieties of insects and worms.

They had suspected that the planet, however hospitable it looked, would be a pretty strange world—even before they'd landed. Its primary was a double star, with both stars and the planet revolving around in the same plane, much like Earth, its Sun, and Jupiter. The planet's axis was exactly perpendicular to that ecliptic plane, so its seasons (which went hot-cool-hot-cold) were provided by the mutual periodic eclipses of the two stars.

But certain geologic features, and the apparent inability of the planet to support complex life-forms on land, caused their scientists to take a closer look at the twin primary. They found that the larger of the two was a recurrent nova. Every eighty years or so, it would flare up for a short period. At maximum, Thursday's Child would be blasted by over a hundred times its normal ration of sunlight.

So the first Burning didn't take them by surprise; they had twenty years' planning time. But there was no clearly superior solution to their problem, among the various possible alternatives.

They could try to survive the way the fish apparently did, getting far enough below the surface of the ocean so they were insulated—both from the radiation and the undoubtedly ferocious weather—by a large mass of water. But how deep would be deep enough? They didn't have time or materials to sink a haven into really deep water. And the water above some impossible-to-compute level would present an environment even more hostile than the land. So they rejected that alternative.

But Watrs onlē fōr dē Ones dat ōn dē watr Wrld
Yr Fadrs nū
An't fōr sinfl Man dē simpl Refūj of dē Sē
Yr Fadrs nū.

—Godbuk 1, 4, 26-29

They also rejected the idea of burrowing beneath the ground, which was the way the primitive land animals managed to make it through the holocaust. There was a good deal of seismic activity even under the best of conditions.

The poles offered one answer. Especially the northern pole, where a high-walled crater near the top of the world made a kind of natural fort, within whose walls the suns' rays never fell. It was bitter cold, of course, but they could cope with that.

Transportation was a problem. The one scout ship they had used for exploration could carry little more than its pilot. But they had tools and time, and there was plenty of wood, so they opened various colonists' manuals and set about learning how to build ships and navigate them.

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The final solution was both simple and daring—foolhardy, some maintained. That was simply to lift the starship back into orbit, and wait out the storm in the still of space, protected by the shadow of Thursday's Child. But the engineers couldn't guarantee that the ship would even lift properly, let alone perform any kind of sophisticated maneuvering.

Finally they split into two groups, most of the colony building the flotilla that would take them north.

Dā warn[d] dē Ones dat sot a plās of Sāftē in dē Skī
Y[r] Fadrs nū
*Dā sed^ God didnt put us on dis Wrld tū let us lēv^*
Y[r] Fadrs nū.

—Godbuk 1, 4, 34-37

The small group who had opted for the starship ran out of luck very quickly. The engines quit at an altitude of less than a kilometer, and they fell into the sea. For many years the remains of the starship were visible in the shallow water, but eventually it became the nucleus of a long-lived organism resembling a coral reef. Its location was forgotten, and over the course of a few dozen generations the very fact of its existence evolved from memory into oral history and, finally, into myth.

The ones who had gone north didn't have an easy time of it. Over half of them died, some from exposure during the rigorous crossing from the arctic sea to the inland crater, but most were killed at the height of the twenty-day storm, whose effects were worse than had been predicted by the most pessimistic scientist. Perhaps it was just as well, since over half of the food and seed were also lost.

Having known the seas were going to rise, they'd moved what they couldn't carry with them to the nearest high ground. Their livestock and seed and other absolute necessities went into the boats, along with a year's worth of food, and they headed for the northern ice. There, they dismantled the boats and re-formed them into sledges, and most of them made it to the crater. The inside of the crater wall was conveniently pocked with caves; the nomads walled themselves in and waited.

But the caves that were too close to the crater floor—including the ones that housed the livestock—filled up with boiling water at the height of the storm. They had started out with twelve hundred people and eight hundred head of livestock. When they came out of their caves after the water receded, there were five hundred people, two roosters, and a hen.

Without draft animals, returning to the sea was much slower than getting to the crater had been, even though the coast was less than a third the distance it had been be-

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fore the storm. They bolted wheels to their sleds and pushed and pulled them across muck that was already beginning to freeze again. Then they dismantled the sleds and nailed them up into the shape of boats, and returned over warmed seas to the place they had called Primus.

Finding Primus underwater surprised nobody. Much more disconcerting was the fact that the mountains had been scoured clean, and there was no trace of their caches of goods, records and equipment. Much that had been irreplaceable was lost, including the ship's library and the cloning equipment that would have replaced their herds of animals.

Lars Martin and his contemporaries didn't know any of this. The only written records that had survived from "ancient times" were The Sonets of Wm. Shākspēr, twelve of which had been passed from father to son as one family's tradition, and a thing variously called God's Book, Godbuk, or God Buk; spelling having become more a matter of opinion than of authority. This volume was a mixture of mythologized history and moral guidance, most of it rendered in iambic-septameter doggerel.

The Shākspēr book was one that Lars had memorized word-for-word, although he kept a copy as part of his own meager weight al-

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lowance. And Godbuk he studied constantly. Not for moral guidance; he had his own, fairly conventional, ideas and was reasonably true to them.

Fred continued his gentle baiting. "Like that God's Book you're always reading. You can't really think it's worth a pound of seed."

"Be serious, Fred."

"I am being serious." He opened a copy of the book and flipped through its accordian-style pages. "Half serious. I suppose it's useful for scaring children and keeping them lined up properly. Not much else."

"You're dead wrong. It's the closest thing we have to a historical record. Everything else is just what somebody told somebody."

"You're still dancing that jig?" He slapped the book shut. "Somebody sat down and made that up. Some *priest.*" No one in Samueltown had been a priest for more than three generations, and most of the townspeople shared Fred's contempt for the profession.

"That's not strictly true," Lars began, but Fred cut him off with a laugh and an out-thrust palm. "Save it. Too much work for idle argument," he said, which was true, and he jogged away.

Shaking his head, Lars slid Fred's precious metals into a small fish-bladder bag, tied the mouth of it shut, and affixed an identifying label. He recorded the bag's contents in his notebook, then set it on top of a pile of similar bags. He squinted at the low suns. About another hour; then he could carry the bags to the ship's lockup hold and go home.

A few days later, they were under sail; eight ships that drew power from oars as well as sails, in case of calm. As closely as could be divided, each ship held one-eighth of Samueltown's resources, human as well as material. Most of each ship's cargo was made up of food and seed. They had to save food enough to last the town a year or more, until the waters receded enough for planting and the fish started biting again.

As long as the wind and currents were favorable, there was plenty of time for "idle argument." Lars and Fred and the town's mayor, called Samuel by way of title, were resting in the shade after an hour of cleaning fish. It had been a noisome job, since the offal was collected and kept in a trough at the stern, to use as chum for attracting other fish.

Samuel was in an especially bad mood. She had been a farmer all her life and had worked the same piece of land through thirty years and two husbands. In a few months now, her orchards and vines would be under fifty fathoms of steaming water. If she ever farmed again, it would mean starting from scratch on a sterile mountaintop.

She folded her arms on the rail-

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ing and stared down at the inky blue water. "You've talked to a priest, haven't you."

"The one in Carroltown," Lars said. "When I went down to copy the annotations in our Godbuk."

"Did he have any answers?" Her voice was almost a snarl, though she was close to tears. "Why this happens? Why we just have time to get started and . . ."

"He had all the answers," Fred said. "Right? They always have."

Lars shrugged. "You know how I feel."

"Yeah, but you're crazy." Fred picked at a splinter in the decking. "You only get half a vote."

"Nice if we could settle it with a vote," Samuel said. " 'The suns should stay dim. Vote yes or no.' "

"You can't just dismiss what the priests say. Just because they're priests. They know things—"

"The problem with most people," Samuel cut in, "isn't that they don't know a lot of things. Just that most of what they know is wrong."

"You wouldn't have applied that to this man," Lars said. "He was pretty impressive. Spent all of his life, eighty *years*, just learning."

"That's Carroltown for you," Fred said. "Learning what? Anything but an honest profession."

"He had what he said was a calling."

"So do I. God told me in a dream, 'Fred, you just sit back and take it easy. Working at that damned forge is giving you blisters on your blisters.' Nobody believes me, but it's true."

"People like that are useless," Samuel said. "They're like the sucker things you sometimes find on a grayfish. Taking without giving."

"You class me that way, Samuel?"

"No. You work hard, I know it. One time I had six children in the house, all at once. How you handle ten times that number is beyond me."

"I make them want to learn. So they keep quiet and pay attention, most of them."

"That's in the nature of children," Fred said, "indulging their curiosity. Most of us grow out of it. Your priest friend was just a child with a long beard."

"Maybe so, in a sense. But meeting him was . . . about the most important thing that ever happened to me. He started me thinking about the Godbuk."

Fred laughed. "Then he should have been taken out and drowned."

"Something he said?" Samuel asked.

"Something he showed me." Lars leaned forward, intense. "I never told you about this?"

"You've told me," Fred said.

Samuel shot him a look. "I don't think so," she said. Best to keep him on familiar ground.

"Wake me up when it's over."

"He didn't show me himself,"

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Lars said. "He was too old to make the journey. But he drew me a map and sent a guide along with me."

"To where?"

"A place well south of Carroltown. A cave in the mountains. How well do you know chapter four of the first Testament?"

"Not well. It's about the first Burning, isn't it?"

"That's right." He ignored Fred's snort. "It tells how one group tried to escape the Burning by getting back in the ship that brought them here. They got it back up into the sky again, but it fell and killed them all."

"I remember."

"Well, Godbuk says there were fifty-one of them, and it says the ship's captain was named Chu." He started to get up. "I'll show you; let me get—"

Samuel waved him down. "I'll take your word for it. Go on."

"Ships in the sky," Fred muttered.

"There were words in that cave, carved into the rock. They were hard to read—so old that the very rock was crumbling with age, even though it was inside, protected from wind and water. The writing was very strange, in a style I'd never seen before.

"It said, 'In memory of the nova's first victims'—I don't know what that word means, obviously something about the Burning—and it's followed by a list of fifty-one names. The name at the top is Chu."

"Doesn't prove anything." Fred opened one eye. "It might be old, sure. But even if it was written by the same crowd of priests who wrote God's Book, it's still just a children's tale."

"But Fred . . . even *you,* Fred, you have to admit there is at least a small possibility that the inscription is real; that it commemorates an actual happening."

Fred smiled at him and closed his eyes again. "Ships in the sky."

"—and if that part of Godbuk is true, maybe other parts are as well. Certainly other parts are."

"Like coming here from another world?" Samuel said. "Spending twenty-eight years on a ship that flew through the air?"

"Through the sky, not 'air.' It says there wasn't any air."

"That doesn't make it any easier to believe," she said.

"Well, maybe that part's not strictly true," Lars conceded. "It might just be the result of some copying error ages ago."

"That's the first sensible idea you've had in several minutes," Fred said, yawning.

"I'll tell you what, though. You could even make a case for that. For there not being any air."

"I couldn't," Fred said. "Wouldn't."

"The higher up you go on a mountain, the harder it is to breathe. It seems logical that if you

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went high enough, you'd run out of air altogether."

"But–"

"And they were so high it took them twenty-eight years to come down!"

"But if there isn't any air . . . what *is* there?"

Lars shrugged. "Sky. Just sky."

"Don't forget the stars," Fred said. "They'd be all around you, like lightbugs."

"Maybe they would. Maybe they're too far away; you'd never get close to them."

"Maybe, maybe. Maybe you ought to try it–get up in that thin air and it might clear your head."

"Some of us are a little worried, Lars," Samuel said. "All the time you spend studying that Godbuk. All the charts and outlines and such."

"I get my work done."

"I know you do. It just seems like a regretful waste of time and talent." Among other things, Lars had reinvented the water pump and devised an oil-flotation bearing for compasses. "We'll be needing all of your cleverness for the rebuilding."

"I'll get my work done then, too." He settled back against the railing. "Don't you see, though . . . that we condemn ourselves and our descendants to . . . that we *guarantee* life will never be any different. Not unless some people waste their time and talent thinking about why things happen."

"Things happen," Fred said sleepily. "That's all."

Sumtīms tū hot dē ī uv Hevn shīns,
An ofn is its gōld cumplekshn dimd,
An evry fār frum fār sumtīm dēclīns. . .

The Twenty-fourth Burning was no more or less severe than the twenty-three that had preceded it. The people were better prepared than they had been in the first couple of Burnings, and rarely lost more than one out of five able-bodied men and women, though small children and old people had a higher mortality rate.

The world had prepared itself the same way it had for millions of years. Before the nova suddenly waxed bright, fish headed for cool deep water, to estivate. Insects spun themselves silver chrysalides, and that season's plant seeds wore protective garments of tough fiber.

And at the appointed time, within a single day, one sun's brightness increased a hundredfold, kindling a universal forest fire from pole to pole that marched around the world with the dawn. As the fires consumed themselves, the sea began to steam, then to boil. The ashes of the world were scattered by a fierce wind of ozone and superheated steam. The sea rose and spilled boiling over the sterile plains. And as the nova faded, it began to rain.

In the fragile safety of their caves, men and women crouched

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around flickering lamps, unable to sleep or even to speak for the manic wail of the wind outside; a wind that would corrode away the polar ice in a couple of days; a wind that tossed large rocks around like pellets of sleet; a wind that would strip the flesh from bone and then scatter the bones across half a world.

The first rain fell boiling and rose back into the sky. (The planet that had looked so green and blue and hospitable glowed an even baleful white.) After a while some of the water stayed out of the air, and the planetwide storm gentled to mere hurricane force. It rained, hard and long.

When they came out of their holes, the rain was only a warm mist. By the time their caravan was spiked together, deep blue sky sometimes showed through the clouds, and the suns revealed themselves several times a day as they rolled along the horizon. The mud began to congeal and they left the polar crater the day of the first snow.

They made it back to the islands that had been hills overlooking Samueltown. Only 178 people had been lost, and fully half that number had survived the storm, but were on a boat that had one night mysteriously disappeared.

Lars found the hill where he had buried deep a chest full of books and other valuables. He had marked it by attaching a long chain to one handle and allowing a length of chain to protrude above the ground.

They never located it.

They raked compost into the side of the hill and planted rice and barley; then rowed to the other hills and did the same, waiting for the shallow water to recede from their fields.

It would be fifteen years before the first full crop came in.

Samuel and Lars remained friends over the years; for a short awkward time they were even lovers. But Fred grew progressively bitter in his jibes as Lars became more convinced of his theory that Godbuk was veiled, literal truth. Most people in Samueltown thought Lars was a valuable man, if slightly dotty, but Fred was the leader of a vocal minority that withdrew their children from his school, rather than have them be taught lies. Which amused the rest of the town. Lars' stories were fantastic, but it was the sort of thing that would hold a child's attention and give him something to prattle about. Life was joyless enough; why deprive children of a little spark of wonder, no matter how silly?

Lars had finished grading the arithmetic slates and was putting the children's names on the board, in order of accomplishment. Maybe Jonny would work harder tomorrow, to get his name off the bottom

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of the list. He turned at the sound of a polite cough.

A stranger was standing diffidently in the doorway, which sight almost made Lars drop the slate he was holding. It had been years since he had seen anyone he hadn't known all his life.

"Uh . . . what can I do for you?"

"You're the town book-keeper." The man was doubly a stranger for being blond, a feature so rare in Samueltown's genetic pool that not a single individual in Lars' generation had it.

"That's true."

"Well, so am I. My own town, that is. Fredrik, south and east of here."

Lars had heard of it. "Come in, sit down." He walked over to the desks where the larger children sat. "Are you just traveling?"

"Mostly copying. We lost too many books last Burning."

"Didn't we all. Can you pay?"

He shook his head. "No. But I can barter . . . if any of the thirty-some books I have interest you." He opened up a tanned-hide bag and Lars sorted through the books, while the stranger looked over Samueltown's small library. Lars decided he wanted to copy "Sewing" and "Mill Construction," for which he traded the copy-right to "Metal Work" and "Computation."

The man, whose name was Brian, stayed with Lars for a month of copying. They became good friends, taking their meals together (with most of the other bachelor men and women in town) at Samuel's; sitting by her fireside with cups of sweet wine, exchanging ideas until the late hours. When Lars was drafted to help flense a huge fish, Brian took over his school for a day, teaching the children rhyme and song.

After the month was done, though, Brian had to move on to the next town. He asked Lars to walk him down to the river.

There was nobody else at the riverbank that time of morning, the fishing boats having put out to sea at first light. It was a cool, breezy day, the new forest on the other side of the river making soft music as the wind pushed through the tall hollow stalks of young bamboo-like trees.

It was a pleasant way to start out a journey, and as good a setting for good-byes as one might desire. But Brian set his things on the pulley-driven raft-bridge and then silently stepped onto it, as if he were going to leave without a word, without a handclasp. He turned to Lars looking more sad than the occasion should have warranted, and said abruptly:

"Lars, I'm going to tell you something that I've said to no one before, and will never say again. You must not ask any questions; you must never tell anyone what I say."

"What—"

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He continued rapidly. "Everything you believe about Godbuk is true. I know that very well, for I wasn't . . . born on this world. I am an observer, the latest of many, from Urth. Which is not a myth, but an actual world in the sky. The world from which all men came."

"You really—"

"You can't tell anybody this truth for the same reason I can't. It would raise false hope.

"We rediscovered this world some fifty years ago, and immediately began preparations to move you people off this . . . inimical world, either to Urth or, if you prefer, to another world, similar to this one but more pleasant.

"We can build a flotilla of sky ships that will hold everybody—and it *is* abuilding. But such a thing takes time. Many generations."

Lars was thoughtful. "I think I see."

"There may be two more Burnings before the rescue can be made. You know human nature, Lars."

"By that time . . ." he nodded. "They might not greet you as saviors. The memory would tarnish and . . . you would be seen as withholding freedom, rather than giving it."

"Exactly."

They stared at each other for a long moment. "Then what you want of me," Lars said slowly, "is to stop teaching the truth. Now that I know it's the truth."

"I'm afraid so. For the sake of future generations."

Brian waited patiently while Lars argued with himself. "All right," he said through clenched teeth. "I promise."

"I know what it means. Goodbye, Lars."

"Good-bye." He turned abruptly to save a young man the sight of an old man's tears, and walked heavily down the path back to his school. Today, class, you are going to study long division, the use of the comma, and pottery. And lies.

Brian watched the old man walk away and then hauled himself to the other side of the river. He started down the path toward Carolltown and wasn't surprised to find a man waiting for him at the first bend in the road.

"Hello, Fred."

Fred got up, dusting off his breeches. "How did it go?"

"He believed it, every word. You won't have any more trouble."

Fred handed him a small sack of gold. He weighed it in his palm and then dropped it into his bag without counting it. "I liked the old man," Brian said. "I feel like a grayfish."

"It was necessary."

"It was cruel."

"You can always give back the gold."

"I could do that." He shouldered his bag and walked away, south to the town where he was born. ■

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special feature

the search for truth

Frederic B. Jueneman

This is a biased commentary on Dr. Immanuel Velikovsky—the man, the central hypothesis, and the most recent events leading up to his challenge at the San Francisco Conference of the American Association for the Advancement of Science, all relating to the controversy he engendered a quarter-century ago. If you are either pro- or anti-Velikovsky your mind is already made up, and to try to effect a change in anyone's thinking is not my primary intent—besides, it usually accomplishes little other than garnering ill-will.

Since my prejudices are in favor of Velikovsky the anti-group will probably stop reading right here, while the pro-group will hang onto every word right down to the very end. (Actually, I should address myself more to those who try to maintain a healthy degree of skepticism; who may never be picked for jury duty because overwhelming one-sided evidence for-or-against becomes, for them, a red flag, a challenge to be resisted in the face of accepted and conventional thought; who see danger in unanimity because some fundamental questions may never be raised.)

The Velikovsky affair has been compared by his supporters with the antagonisms surrounding Copernicus, Giordano Bruno, Galileo, or Louis Pasteur—and Galileo in particular. Those who disagree more or less vehemently consider these unfair comparisons, and in the words of Isaac Asimov "are ingenuous." I agree, and furthermore I would venture to say that the case of Velikovsky is *unique* in the annals of scientific inquiry. To my knowledge there has never before been in the history of rational thought such a massive documentation of the events relating to a single individual, his adversaries, and the sociological pot-boilers which have been written defending his views.

To give a brief background for those who may not be acquainted with Velikovsky, his 1950 book "Worlds in Collision" claimed that Venus and Mars made fly-bys to the Earth some 35 and 28 centuries ago, respectively, and electrically repelled each other through titanic lightning discharges between the planets: Venus-Earth, Venus-Mars, and Mars-Earth. These claims were rooted in his in-depth researches in

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the historical records of both geological and archaeological findings, and in so doing also found that the bulwark of world chronology—the heritage of Egyptian lineage—upon which all ancient history is compared, is in a chaotic state. He asserted that dynasties were either missing, never existed, were duplicated, or displaced from 500 to 800 years out of time.

This was some pretty strong stuff for those scholars who had spent their lives building their careers on conventional history and science, and for this reason they were, in their separate fields, voluminous in response, and still hotly dispute Velikovsky's claims. But because he had cut a swathe across so many disciplines, and incited so much vituperative criticism, it may take years to sort through and catalog everything that has been published, written, recorded, or just merely commented about him and his work.

Perhaps because he is a multidisciplinarian the cross-fertilization of ideas—even for those highly critical of his basic premises—will be benefited by his challenges; or rather, they should, as the growing body of published literature, whether influenced by the shadow of Velikovsky or not, is rarely restricted these days to a solitary subject per paper per journal.

Velikovsky's appearance on the scene with the publication of "Worlds in Collision" was not a singularly unique event in itself. The 1950s were years in the midst of an era of revolutionary thought, and it is almost without question that he was one of several catalysts that shaped contemporary thinking in the several sciences and history, not to mention behavioral psychology. Shortly after his book came out stating that Venus was a comet-like body within historical times, having most probably erupted from Jupiter, a rash of papers appeared in the journals discussing the origins of comets, with a few of these extemporizing on their genesis in the Jupiter-Saturn sector of space. Nevertheless, in severely questioning Velikovsky, the various disciplines were incisively questioning themselves, and in so doing were exposing with embarrassing clarity the nakedness of the gaps in the body of knowledge. (We have a basic question here of whether we should believe what is observed today is the sum total of what will be observed tomorrow, or the total of what was observed yesterday.)

During the 1950s, when he was the most vehemently excoriated for his heretical ideas that ran counter to the accepted views of celestial mechanics and ancient history, most of both his critics and supporters were much too close to the problem to discuss rational solutions. With characteristic 20-20 hindsight we can see that the 1950s were brimming with new waves of thought—in one sense not unlike

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the 1890-1920 era which sparked a renaissance in the arts and sciences with the works of Picasso and Einstein, Stravinsky and the Curres. Twenty years ago we rather uncomprehendingly saw the emergence, or re-emergence, of radical ideas by de Broglie, Heisenberg, the Bardeen-Cooper-Schrieffer trio, Alfvén, Wegener and many, many more who contributed to this newest and latest renaissance. Some met more resistance than others, a few none at all. (The tale of molecular biology is a story in itself.)

Because Velikovsky predicated his observations in the sciences on his researches in the historical records, some of which are obscure or no longer extant, he was severely taken to task for such an unconventional approach. However, there were plenty of precedents for this little-traveled avenue, spanning the centuries from Pythagoras to Newton and down to our own time. Unfortunately we don't have a working model of a time machine at present to directly observe what events caused the sudden collapse of the Middle Kingdom in Egypt and the simultaneous fall of the First Dynasty in Babylon, or what caused the universal deluge, or caused the other three major global events which affected or changed world history, geology and climate.

We have the technological capability to indirectly approach these difficulties, *sans* benefit of a time machine, by observing with an analytical eye the remnants of ancient civilizations, and by probing our planetary neighbors with fully instrumented (and perhaps manned) space vehicles. According to Velikovsky, Venus was on an elongated orbit and made a pair of passes to the Earth some 52 years apart, circa the Fifteenth Century BC, at the time of the Exodus and the celebrated long day of Joshua, exchanging naphtha and bituminous matter for oxygen and nitrogen. Then later, about the time of the Trojan War, Venus had an altercation with Mars—which may have been on an inner orbit, knocking it farther out. And, finally, in the eighth century before our era, Mars itself made a pass at the Earth before being catapulted toward its present position.

Well, celestial mechanicians didn't take very kindly to a nonmember using their private poolhall for a serious game of celestial billiards. But recent findings by our Mariner spaceprobes and radiotelescopy have shown Venus to be an anomalous planet; except for its small size its atmospheric envelope seems more akin to the gas giants—the Jovian planets—than the terrestrial group. If Velikovsky is right then the atmospheric exchange effected by the close encounter would have ignited a conflagration on Venus, and oxidized the volatile organic material in its atmosphere. One interplanetary thunderbolt

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would have been sufficient to initiate this holocaust, achieving temperatures far in excess of what is needed to dissociate molecular structures, and undoing years of Fischer-Tropsch synthesis.

Moreover, since electromagnetic effects weren't considered to play anything other than a minor, almost insignificant role, in comparison with gravity and inertia, there was no way for celestial mechanics to approach the thermodynamics problems in explaining away the heat that would otherwise have been generated by close planetary encounters. EM effects could, if theoretically permitted, dissipate massive amounts of energy by means other than converting them into devastating heat losses, which would have left the Earth's surface a bubbling slag heap, boiled the oceans into space and dissociated the water into the respective elements hydrogen and oxygen.

Yet, terrible devastations did wrack the entire Mediterranean area about -1500, which weren't only limited to the Thera-Santorin volcanic blow-up that was about an order of magnitude more explosive than the 1883 Rakata eruption on Krakatoa in the Java-Sumatra Sunda Straits. According to Professor Claude Schaeffer, the doyen of French archaeologists and the principal digger at Ras Shamra (Ugarit) in Syria, there were five destructions between -3200 and about -700, the worst being the -1500 event.* Nor were these limited to the Indo-European sphere, but were global in scope. (Schaeffer thus agreed with Velikovsky that not only did five extraordinary occurrences take place, but they also wreaked havoc with historical chronology through the decimation of emerging civilizations and the destruction of their recorded documents, beercans, and whatnot.)

Now, electromagnetic phenomena can dissipate energy through several mechanisms: by electrical discharges, coronal or radiative effects, or by the gain or loss of a magnetic field or a polarity reversal, to name a few. We know that the moonscape is pockmarked with craters, rilles and domes, and more recently Mariner IX showed us a Mars that was not dissimilar, and even Venus is now found to have broad, shallow craters. Velikovsky had pointed out years before that Mars would be found to resemble the Moon, and that many of the Martian and lunar craters were created not by volcanic action or meteorite impacts, but by enormous electrical discharges, with Tycho and Aristarchus as prime examples, and possibly Nix Olympica among others on Mars. It was more recently conjectured by Ralph E. Juergens that the lunar rilles may be the remains of branching, surface anodic discharges which exploded the channels during one or another

*Schaeffer and Velikovsky disagree as to the date

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of those brobdingnagian lightning strokes which were exchanged between planetary bodies. I think, myself, that some of these rilles may possibly be collapsed tubes of glassy material similar to the hollow fulgurites that are formed by lightning and occasionally found in the desert or at the seashore.

The Moon does not have a protective atmosphere or magnetosphere to absorb and reradiate the energy of close planetary encounters, and hence Velikovsky felt the surface was either entirely molten or at red heat. Thermoluminescent studies of samples brought back by the Apollo series have shown unusual, recent effects of extreme heating, and since paramagnetic residuals fade away when the temperature rises above the Curie points for lunar materials, inordinately high magnetic remanence found in the samples has pointed to even later, more recent dating. (The term *recent,* however, carries its own quanta of semantics, depending on whether one is an archaeologist, geologist, historian or paleontologist.)

If with some degree of open-mindedness we are to use Velikovsky's theory as a working hypothesis, in spite of apparent contradictions and various unknowns, we must put a manned laboratory on the Moon and perform on-site studies. We gain precious little knowledge from sheer conjecture and scattered, isolated samples. But even this wouldn't necessarily settle any controversies; more likely it would generate a spate of new ones. Be this as it may, we still need additional samples.

We have made spectroscopic studies of Venus's atmospheric canopy, but have scant information of conditions and compositions below this surface and down to the planet itself. If a determination is to be made whether these clouds contain hydrocarbons in sufficient quantities to have been responsible for recent deposits of petroleum and asphalt on Earth, as Velikovsky insists, we must have samples. NASA administrator James C. Fletcher recently announced that instrumented metal balloons could act as floating laboratories in Venus's dense atmosphere, telemetering back *in situ* information. (Personally, I'd recommend glass spheres instead of metal, as glass in such a form increases in strength as pressure increases—a bit of stray information gleaned from deepsea experiments.)

If the surface of Mars was also lately molten and hit by interplanetary discharges, or if it was merely eroded by a long-lost atmosphere and distorted by vulcanism, we still need samples to ogle, fondle and sniff.

If Jupiter's Great Red Spot is a gaping maw from which Venus was once eructed, we must make closer observations of this phenomenon as well as the banded zones of the Jo-

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vian atmosphere, either from an instrumented package floating in the clouds or an observation post from one of the Galilean satellites. Comets have been theorized as originating from the vicinity of Jupiter or Saturn by Professor Sergei I. Vsekhsviatsky, director of the Kiev Observatory, USSR, and, incidentally, one of the few astronomers who agree with certain aspects of Velikovsky's catastrophism. That a planet-sized body was once a comet-like apparition is pretty heady fare for the delicate digestion of a conservative science, even for one so recently spiced with pulsars and quasars and big black holes. But again, we require samples to play with, if at all possible.

For inaccessible comets, at our present level of technology, we have to rely on spectroscopic and radiotelescopic analysis. It was by such means that Earth and Venus were found to have comet-like tails streaming away from the Sun—albeit quite ephemeral, nevertheless they exist.

Now, I'm going to blatantly editorialize: The purveyors of the conventional and accepted views of science state their cases very well. Their description of the scientific method is delineated in precise terms that grasp the essence of scientific inquiry very well, as indeed it should, for these spokesmen have had considerable practice in distilling and refining their rhetoric, and in so doing win approval of their colleagues and peers. And, of course, do a beautiful snow-job on uninitiated undergraduates and the nonacademic community. Well rehearsed biases, when mixed with an array of facts, reflect a most plausible picture.

This is a two-edged sword, for the same thing can be said of well-read, well-intentioned scholarly cranks who have founded their own schools of thought. However, the power structure of our accredited citadels of learning, through epistemological exclusion, has effectively prevented these apostates and heretics from infecting their domain. But in so doing has achieved a parallel philosophy which makes distinctions between them difficult. Personally, I don't have a quarrel or an ax to grind with the academic community *per se*; still, as a member of the industrial community I have a growing impatience with those members of the academic hierarchy who have taken it upon themselves to tell me what I should or shouldn't believe.

As a for-instance, during the pre-encounter festivities of the Pioneer 10 fly-by of Jupiter held at NASA Ames Research Center, Mountain View, in December of 1973, a panel of distinguished scientists discussed various aspects of the Jovian massif. Dr. Carl E. Sagan, the articulate astronomer from Cornell University, speculated on the possibility of life in the atmosphere of Jupiter

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and, based on experiments performed at Cornell and elsewhere using irradiated gas mixtures of hydrogen, methane, ammonia, water-vapor and hydrogen sulfide, which are assumed to be present in the clouds of the giant planet, he thought that organic matter was being created, which perhaps was the material that gave the bands of Jupiter their distinctive coloration, and which then subsequently rained down to the surface "like manna from heaven."

This business about manna from heaven was a concept forwarded by Velikovsky in "Worlds in Collision" 24 years ago in relation to the atmospheric exchange effected by the Venus fly-bys. Apparently the atmosphere of Venus is radically different from that of Jupiter, but if we regard the assumption of an atmospheric exchange as credible, admittedly without a quantitative assessment, we would—as mentioned before—expect equally radical changes in composition as well. What Venus might have lost as a result of such an encounter, Earth would have regained by a massive Fischer-Tropsch synthesis in our own upper atmosphere. The manufacture of carbohydrates or polyunsaturates from organic or inorganic carbon compounds is performed by nature, with no regard to our understanding of the processes. That such a process could be sustained for years in our upper atmosphere is no more incredible than what we observe at our own level of the biosphere. What *is* incredible is that we're here to observe it.

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As an aside, it might be mentioned that the Mayans of pre-Columbian America had legends of foodstuff falling from the skies, to which they had given the name *mana*. (Also, I believe it was Asimov who, in a moment of mirth, said that implicit in the constituents of manna was cholesterol, for in the Scriptures it is written, "Pharaoh's heart was hardened.")

With a sense of fair play another member of that panel, the outspoken radioastronomer from Colorado University, Dr. James W. Warwick, pointed out that

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Velikovsky had, as Sagan, referred to similar agencies for the production of manna, and also gave Velikovsky credit for priority in the claim that radio noises would be found coming from Jupiter, but by a route of reasoning outside of the sciences. (It is doubtful, though, that the analogous Van Allen Belts of Jupiter will ever be named after Velikovsky.)

Not one to be easily put down, Sagan titillated the audience by saying that Velikovsky "explicitly refers to frogs and flies in the atmosphere of Jupiter," and that it was highly unlikely these would be found; moreover, he closed the door on further discussion with the statement that Pioneer 10 wasn't designed to look for life-forms, much less "Velikovskian frogs," with the added exclamation that one should pay little heed to such romantic nonsense.

The amused listeners had been unwittingly beguiled. With very few exceptions, among them Dr. Warwick, no one knew that Velikovsky had been once again misquoted, then the misquote attacked and held up for ridicule (Cf. "Worlds in Collision," pp 184-7). Velikovsky's own lecture at NASA Ames in August of 1972 was delivered with a suspicion that "vermin" may be found on Jupiter, with no further description. He later elaborated to include larval life-forms.

Sagan then mentioned that, if anyone were interested, "Velikovsky and Science" would have their first confrontation at the February AAAS Conference in San Francisco. But here again Sagan, with a deft touch, either consciously or unconsciously, dissociated Velikovsky from the body of science, denying him scholarly rights, and—since each would be a member of that symposium panel—he apparently thought that it would be beneficial to put as much intellectual distance between them as possible.

However, Sagan inadvertently handed Velikovsky complete and sole rights to the prior claim of advanced life-forms on Jupiter! If anything resembling "frogs and flies" are eventually found there, no amount of gainsaying will amend the record.

Warwick, in a postmortem conversation, although not a supporter, thought that some scientists were a little heavy-handed in their cavalier treatment of Velikovsky. Science, it seems, as espoused by the reigning hierarchy, was not yet ready to accept any of the tenets put forth by the heretic, at least not without a struggle.

This struggle was to have its focus at one of the opening symposia at the AAAS Conference on February 25, 1972. But, it was late in 1972 that Professor Walter Orr Roberts of the University Corporation for Atmospheric Research and past prexy of the AAAS lent support to—if not initiated by him

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originally—the re-examination of Velikovsky's hypotheses by this august body in the light of recent confirmations of the once bizarre theories. This was seconded by Carl Sagan, but seemingly for less lofty reasons.

The proposal was passed on by the Conference Advisory Committee of the AAAS to the program chairman, Howard Greyber, since retired, and it was reluctantly approved and returned to the Astronomy Section to set it up and empanel for the debate. This proposal had not percolated to the level of the Board of Governors of the AAAS, much to the chagrin of some members who would have recommended tabling it as a more judicious measure. The symposium committee, headed by Dr. Ivan King of UC Berkeley, then chairman-elect of the Astronomy Section of the AAAS, the past chairman Dr. David Goldsmith of SUNY Stony Brook, and Dr. Owen Gingerich of Harvard University and the Smithsonian Astrophysical Observatory, all were something less than sympathetic to the Velikovskian view.

At the outset it was felt that the appropriate image to present to outside inquiries, potential panelists, and the public was through the explanation that the recent upsurge in interest had prompted a rehearing of Velikovsky's hypotheses, that the credibility gap between the body of science and the public must be bridged by more progressive intercourse (which leaves one to wonder who's getting screwed), and that this was a move to stem the criticism leveled at the AAAS by various groups for past excesses by the more militant and zealous individual members against Velikovsky.

This had a ring of *noblesse oblige* about it, for as prestigious an organization as the AAAS doesn't normally take a stand against its own for an outsider, nor is it characteristic to cater to a "tried and convicted" crank, no matter how popular. For example, there doesn't appear to be any movement underway to seriously consider the arguments of a von Däniken. Although there was a symposium on UFOs in the past, this year's meeting was the second in a "series" which officially the AAAS would *not* like to continue. Nonetheless, there are a few who feel that there should be further discussion and debate in areas of "forbidden knowledge."

The symposium panel itself was a study in credentials. Those chosen and accepting were Professor J. Derral Mulholland, astrophysics, of the University of Texas, currently on leave to the Astrophysical Section of the Paris Observatory, Meudon; Professor Carl Sagan, astronomy, Cornell University; Professor Irving Michelson, classical mechanics, of the Illinois Institute of Technology and associate professor of the Science Faculty, Nancy,

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France; Professor Norman W. Storer, sociology and anthropology, of Bernard Baruch College, City University of New York; Professor Peter Huber, history and mathematics, of the Eidgenössische Technische Hochschule, Zurich; and Dr. Immanuel Velikovsky, historical cosmology, no university appointment.

Since Velikovsky has no connection with any university or other foundation, it might be well to casually review his credentials: He formally studied mathematics and languages at Medvednikov Gymnasium, Moscow, graduating with honors and a gold medal; premedical studies in the natural sciences were begun at Montpelier, France, and continued at the University of Edinburgh, Scotland. During World War One he studied law and ancient history at Moscow's Free University, and later received his medical degree at the University of Moscow.

In Berlin, with Professor Heinrich Loewe, he founded the publication *Scripta Universitatis,* conceived as the cornerstone of what is now the Hebrew University in Jerusalem. Professor Albert Einstein edited the mathematical-physical volume of this work. In 1923 he married and moved to Jerusalem to practice medicine, and afterward he studied psychoanalysis in Vienna under a student of Sigmund Freud, returning to practice psychiatry in Haifa and Tel Aviv. Velikovsky started another series, *Scripta Academica Heirosolymitana,* as the basis of an academy of science in Jerusalem. In mid-1939 he came to the United States to research a commentary on Freud's "Moses and Monotheism," and then found that these researches were carrying him further and further afield as he found more and more anomalies in the historical records. In the next ten years he completed the bulk of his reconstructions and published two major articles in *Scripta Academica* before the publication of his next four books in the decade 1950-60.

Thus, Velikovsky was as well-grounded as any member of the panel, and in recognition of his contributions was awarded an honorary doctorate at a symposium this past May at Lethbridge University, Alberta. It might also be of interest to mention that a three-day International Velikovsky Symposium was held in mid-June at McMaster University, Hamilton, Ontario, and attended by an imposing array of world-famous scholars. (Once again, one is left to wonder at how many find Velikovsky's "romantic nonsense" credible, or else to marvel at a world gone mad.)

The mood of the AAAS Symposium was set by King in his opening address. As chairman he was subject to pressures from his own peer group, and thus showed his obvious distaste for the assignment by being condescending—a

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subtlety which was not lost on the audience. All of the speakers took more than their allotted time in buttressing their arguments, including Velikovsky, so that after four hours of debate Michelson's talk—the only one which gave, on the side of science, a quantitative evaluation *for* the argument of Velikovsky—was deferred until the evening session.

With at least one exception, Velikovsky replied to each with a protracted rebuttal, taking each expert on in his respective field, ablating their arguments by quoting book, chapter and verse of published experimental evidence which updated the sources relied upon by his opponents, and admonished them to go back and review the literature in their respective expertise. It became abundantly clear that Velikovsky's scholarship wasn't the central issue, to either the panelists or the attendees. If it was the initial intent to demolish his polemics, and thus his hypotheses, by an equally demonstrative flight of dialectics, that approach only succeeded in generating more interest, if not credibility, on the side of Velikovsky. Only the *illiterati,* who had very little grasp of what the issues really were, found themselves becoming impatient with the lengthy debates of either side.

Most unfortunately, for both sides, the evening session was not attended by Sagan, who had opted for an appearance on the Johnny Carson TV program instead. Also, and more importantly, Michelson's discussion, having been delayed, was not heard in its proper context. Michelson presented two new concepts which may have far-reaching impact.

Based on Velikovsky's contention that close approaches of planetary bodies will engender electrostatic discharges, Michelson agreed that such phenomena will occur. Step by step, Michelson outlined the reasoning over the last two decades for the presence of electrical charge on the Sun, and the congruent effects on the planets as a function of their unit surface area. He therefore found that such a postulated charge on the Earth, expressed as an energy equivalent (2.1×10^{36} ergs), was essentially *identical* to the kinetic mechanical moment of energy of the Earth's rotation. The upshot of this postulate is, if the Earth's charge is removed, rotation would stop, and the long day of Joshua would not be scientifically untenable.

Secondarily, Michelson demonstrated that a shifting of the axes of a rotating body, with respect to the astronomical poles, would take far less energy than previously anticipated, or even suspected. For the Earth to shift 180° would be independent of the mechanical moment of the rotation mentioned above, and would take 6.4×10^{24} ergs, or the equivalent of a moderate-sized geomagnetic storm, *as measured at*

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the latitude of the Earth's orbit. Both Mulholland and Velikovsky disagreed with this last. Mulholland confused geomagnetic storms with solar flares, although the latter causes the other, and argued that the Earth's distance from the Sun would reduce solar effects by some eight orders of magnitude or more, and making the tacit assumption that the solar magnetic field is spherical, whereas the magneto-disc tends to be confined in the plane of the ecliptic. Velikovsky, at the other extreme, regarded the triggering mechanism to be near-encounters with planetary bodies as the cause of polar reversals, or merely the shifting of as little as 10°, which would require far less energy.

In retrospect, the near-encounters of the scientists and historians at the AAAS symposium were attempts to refute the predications of Velikovsky by unleashing thunderbolts of empirical knowledge. This has not been done. Nor is it likely to be done unless science can apply itself to the task of understanding the basic premises on which it is itself founded. What was accomplished at this historic meeting was embodied in the realization that Velikovsky is an interdisciplinary scholar of the first magnitude. It might be considered bad form to gainsay an expert from a position outside that field of expertise, as Velikovsky does, but as a past president of the AAAS said in his retiring address, "There is a little scientist in everybody," implying that science is not the sole property of academia. And, coincidentally, Dr. Leonard M. Rieser in his own retiring address this past February expressed concern about the role of science as we enter the "Orwellian Decade," that science has a responsibility which it must exercise to forestall "such a totalitarian nightmare, where science itself is denied a place even in the vocabulary."

The argument of Velikovsky is a fundamental one, which is why it has generated so much controversy. He has fearlessly said that much of our conventional science is a bust and needs restructuring. We've most of us known this for a long time, but with our retreads fashioned of clay very few have been so bold, or have had the insight and scholarship to pursue such claims.

In the theoretical sciences Velikovsky has grafted a new bud on the withered limb of René Descartes' dissertation on celestial vortices by stressing the argument of magnetic interactions between the Sun and the planets, and even among the planets themselves. In the historical playground of ancient affairs he has attempted to set a chaotic chronology aright by coordinating peoples, places and events throughout the Indo-European sphere. In the rock- and bone-strewn fields of geology and anthropology he has refuted the

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basic tenets of Lyell and Darwin for requiring untold eons of time to make appreciable changes in our world, where a few well-placed cataclysms in the seat of evolutionary pants would accomplish the same thing in a far shorter order. He has at the very least opened our eyes to other alternatives, other options for future generations to think of and consider.

Velikovsky is a scholar searching for truth, and his legacy for those who would do likewise is to be intrepid and daring, and you-jolly-well-better document your sources. But that, most of all, one must ceaselessly question anything and everything right down to the bare-bones basic beliefs. *Particularly* one's own motives!

And the search goes on. ■

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Frederic B. Jueneman is a chemist and co-founder of Innovative Concepts Associates, where he directs research services and consulting. He is currently writing a Notebook series in speculative science for *Industrial Research* magazine.

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CP

Isaac Asimov

What I need is a synonym for *crackpot. Crackpot* is a perfectly good English word, and is defined by "The American Heritage Dictionary of the English Language," my favorite dictionary,* as "*n.* An eccentric person, especially one espousing bizarre ideas."

I am therefore tempted to use the word as a description of Immanuel Velikovsky, for he *is,* in my opinion, an eccentric person who espouses bizarre ideas. And yet there is an aura about the word *crackpot* that seems condescending and insulting.

But what else? *Charlatan* and *madman* are far too strong. *Eccentric* (noun) is too weak. *Cuckoo, nut, screwball* are all even more condescending and insulting than *crackpot.*

So let's substitute for *crackpot* the more nearly neutral initials *CP* and continue to define it as "*n.* An eccentric person; especially one espousing bizarre ideas."

It is not my intention here to cite you chapter and verse of Velikovsky's bizarre notions and hold them up for you to see and chuckle at. I have two reasons for not doing so.

In the first place, I have already done this in an article entitled "Worlds in Confusion" which appeared in the October 1969 issue of *The Magazine of Fantasy and Science Fiction,* and which was then included in my book "The Stars in Their Courses" (Doubleday, 1971).

In the second place, Velikovsky really isn't, in himself, a target big enough. He is only one in a long line of men who have hovered about the fuzzy borderlands of science, and he is neither the most important nor the most recent. (In fact, judging from my mail it is von Däniken who is the current first-magnitude CP.)

Therefore, what I intend to discuss is CP-ery in general, using

*Well, it includes "Asimov, Isaac" as an entry, if you must know.

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Velikovsky only as a convenient example of what I'm talking about.

There are CPs everywhere, of course: in religion, in politics, in economics, in social activism, in science-fiction writerhood. What's more, almost everyone has a touch of the CP in him—including most certainly myself, so that you mustn't think I am preaching from any soapbox labeled "normality" or "sanity."

There are, however, degrees of CP-hood and there are certain distinguishing marks by which you can tell a *far-gone* CP; one in whom the CP-ness tends to drown out everything else. And when I use the term in this article, it is the far-gone variety to which I refer.

Remember also that I refer to the CP-in-science particularly, though what I say may well be applicable to other kinds of CP.

Consider, for instance, one property very often found in CPs—that of scenting persecution from afar!

Yes, there is a touch of paranoia in all of us, and the touch is often more or less justified. In the CP, however, the paranoia is more than just a touch and very often seems only minimally justified, if at all.

Thus, Velikovskians revel in claims of having important forces against them, and of being constantly hounded by orthodoxy and by conventional science. There is no account of Velikovsky's theories by anyone who favors them that doesn't begin with the events of 1950, which are portrayed by the Velikovskians as a kind of crucifixion.

Let us see what happened. In 1950, Velikovsky was about to publish his book "Worlds in Collision" and Macmillan was his publisher. A portion of the book appeared in first serial form in *Harper's*, and, for circulation-raising reasons of its own, *Harper's* puffed the article as detailing *scientific* proofs of the miracles of the Bible. What's more, Macmillan planned to publish the book as part of its *textbook* line.

Anyone, of course, can call himself a scientist. It is not a profession for which one must get a license and there is, as far as I know, no legal constriction of the term. I call myself a scientist because I have a doctorate and a professorship, have done research and written textbooks, but I suspect I could call myself a scientist and be safe from prosecution if none of these things were true.

Again, as far as I know, there are no legal restrictions on the use of the adjective *scientific*. If I choose to say something is "scientific evidence" or "scientific proof," I imagine no one can stop me.

However, I may write something that is hogwash; and if I do, the fact that I call it "scientific" and that I call myself a "scientist" does not purify it to any extent. It remains hogwash.

To a number of astronomers in

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1950, and to myself, too, Velikovsky's suggestions as they appeared in *Harper's* seemed rank hogwash indeed, and the fact that it was labeled "scientific" and touted as having been written by a "scientist" made it seem worse.

Some scientists are highly idealistic about the nature of their calling and 1950 was a bad year for them. McCarthyism was beginning; anti-intellectualism was in the air; scientists were getting a bad press from the super-patriots. Harvard astronomer Harlow Shapley, a strong liberal, had been sniped at by the bully-boys, and to him, Velikovsky's claims of proving the Biblical miracles by a farrago of astronomical illiteracies were something that would simply damage science further.

So he exploded, and demanded that Macmillan not publish "Worlds in Collision" as a scientific textbook. If they did, he threatened, he would lead a move to withdraw other textbooks from their list.

This, alas, was a mistake on Shapley's part. Macmillan capitulated (a mistake on their part) and turned the book over to Doubleday and Co., which had no textbook department and could not be pressured. Doubleday published it as a trade book.

That was the extent of the persecution and the attempt at censorship. Wrong though the reaction of some astronomers was, there was no attempt made to suppress the book as a book; merely to withdraw from it any official label as "scientific." This was still wrong, but it falls far short of true persecution.

Velikovsky certainly did not suffer as a result. "Worlds in Collision" has been a best-seller ever since it was published. For all the self-pitying martyrized claims of the Velikovskians, not one copy of any of his books was ever not sold because any scientist prevented its sale. In fact, had there not been that misguided attack on Velikovsky, the book would undoubtedly not have done as well.

But that doesn't matter. A CP thrives on persecution and the Velikovskians have labored hard to build a legend of one brave man standing single against all the forces of orthodoxy.

The CP-in-science, reveling in persecution, cannot help comparing himself to those great men of science who were persecuted and reviled in the past. I call this "the tendency to the heroic analogy."

Galileo is the prize example, for he was actually called up before the Inquisition and threatened with torture (though not actually subjected to it).

The argument, placed in syllogistic form, is:

Major premise: Some A are X.
Minor premise: I am A.
Conclusion: I am X.

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To see the fallacy here, consider the correct syllogism, which is:

Major premise: All A are X.

Minor premise: I am A.

Conclusion: I am X.

The difference between "Some" and "All" in the two syllogisms is precisely the difference between nonsense and sense.

Made specific, the fallacious argument goes as follows: "As all men know, Galileo was persecuted as a heretic and CP and turned out to be a genius who had discovered truth. Since I am being persecuted as a heretic and CP, I am certainly a genius who has discovered truth."

Can this possibly be accepted as correct? Can the fact that some geniuses appeared to be CPs be used to prove that any CP must be a genius?

Let me quote, in this connection, the great philosophic team of Bud Abbott and Lou Costello. Costello has just suggested an absolutely idiotic proposition, and Abbott, in exasperation, says he's crazy. Indignantly, Costello says, "Oh, yeah. They said Edison was crazy. They said the Wright Brothers were crazy. They said Luigi was crazy." Naturally, Abbott says, "Who's Luigi?" and Costello, in a confidential aside, says, "He's my uncle. He *is* crazy."

I think we may safely say that for every Galileo who was called a CP and turned out to be a genius, there are a thousand (or more) who were called CPs and turned out to be—CPs. To compare oneself to Galileo is therefore disingenuous and the more vehemently it is done the more likely it is that the CP is just what he seems to be—a CP.

I say this on purely statistical grounds, since of all the CPs who, in the three centuries since Galileo, have compared themselves to Galileo, none as far as I know turned out to be Galileos. There were Galileos, of course—Newton, Faraday, Einstein, to name three—but these never loudly and angrily compared themselves to Galileo. Their work spoke for them—and Velikovsky's speaks for him.

The comparison with Galileo also extends to a confusion between the modern scientific orthodoxy that opposes Velikovsky and the earlier religious orthodoxy that opposed Galileo.

The religious orthodoxy had, at its disposal, the stake, the rack, and the thumbscrew, to say nothing of the mob, which could be easily roused to hunt down the heretics. The true analog to that is the political orthodoxy of today, which, even within a democratic government, can dispose of fearful weapons.

But scientific orthodoxy—why, it is the weakest and most powerless orthodoxy ever invented.

In the old days, John W. Campbell, the late editor of this magazine, engaged in a lengthy correspondence with me, and his letters

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dealt mainly with his own notions, many of which were bizarre indeed. (I loved John like an older brother, but the fact is that he was a pronounced CP in some ways, and I told him so often enough.) In letter after letter, he denounced scientific orthodoxy, and upheld various follies such as dianetics, the Hieronymus machine, and the Dean Drive. He pictured himself always as a persecuted rebel, hounded relentlessly by the great and powerful scientific priesthood.

I finally broke down and wrote as follows: "Why do you persist in considering yourself part of a persecuted minority, John? Look about you. Billions of idiots on Earth believe in magic, in ghosts, in omens and the evil eye, in astrology, in any and every variety of folly that you ever heard of or can invent. Among all those billions there are perhaps one or two tens of thousands who are rationalists and who accept only what their senses and their reason tell them. We few are friendless and alone and it's cold out here exposed to the winds of logic. Can't you leave us to our misery and spare us the wild accusations of evils we lack the power to commit even if we had the will?"

And isn't this so? In what way is the powerful scientific orthodoxy hampering Velikovsky? He has many thousands of devoted followers, who spew out endless nonsense in his name, who publish magazines devoted to spreading his irrationalities, and who write endless, furious letters to anyone daring to lift his voice against them. (The letters I have got in the past, and the letters I will get in response to *this* article! Wow!)

And on the side of orthodoxy, what do we have? A few astronomers with no popular following and no experience in the kind of polemics in which CPs are at home. The most effective critic of Velikovsky is, in my opinion, Cornell astronomer Carl Sagan, and as far as I know, he has no emotional, willing-to-die-for-him supporters except me.

So they have a scientific conference on the Velikovskian theories and the "orthodox" scientists, Carl Sagan in particular, pull Velikovsky's theories to shreds. But they are scientists, "open-minded" by profession; not apt to close the door totally against the possibility of being wrong; and after the 1950 experience hesitant about seeming to be persecutors. Velikovsky, with none of these inhibitions, naturally charges forward, repeating all his errors at the top of his voice, and is reduced to making incoherent threats against Sagan.

But this pleases his followers, especially when he announces that not one word of his 1950 book has had to be changed as a result of scientific advances since its publication.

It is not surprising that

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Velikovsky should make such a claim, since it is rather characteristic of the CP that he insists on considering himself infallible.

Here is an example of the opposite, however. Some years ago, a Soviet scientist detected what seemed to be a new and startling form of water, never before detected. It was eventually called "polywater." Western scientists were skeptical but they investigated and confirmed the work, and for a while polywater rode high. But then further evidence accumulated and polywater turned out to be impure water, largely a solution of sodium silicate. The Soviet discoverer considered the evidence and finally agreed. He made no claims of persecution; he abandoned polywater. He was a scientist, and not a CP.

Of course, I wouldn't expect Velikovsky to back down if he is right, or even if he only thinks he is right. But is there really not one sentence in "Worlds in Collision" which he cares to modify? Is there not one thought he had in 1950 that he would care to improve or alter?

This very rigidity has the smell of CP-hood about it. On the basis of past experience, we can say that those who have been most insistent on possessing a pipeline to ultimate truth, have been most howlingly mistaken.

And yet—and yet—perhaps "Worlds in Collision" does indeed not need to have one word changed. Its quality of pure and glorious nonsense was perfect as of 1950. No change could improve that quality in it.

Thus, by Velikovskian astronomy, Venus was spewed out of Jupiter in the Fifteenth Century BC. It passed very close to Earth and temporarily stopped Earth's rotation. Never mind the reasons against this, since Velikovsky doesn't accept the laws of motion, the law of conservation of angular momentum, the law of conservation of energy and other such trivialities.

Granting this as possible, however, you would think that such a howling catastrophe as the Earth's stopping short would never be forgotten by the survivors of the event. (Only by Velikovskian reasoning would there be any survivors of course.) The lack of any more evidence than exists in scraps of myth and legend—and, of course, in the early books of the Bible—is attributed to a kind of collective amnesia that struck mankind.

Presumably the collective amnesia also struck the inanimate body of the Earth, for there are a number of geological processes that have been continuing undisturbed for many thousands of years and that show no signs of having been affected by so unimaginably tremendous a jar as would be produced by the sudden stopping of the Earth's rotation. There is the

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formation of river deltas, the slow growth of stalactites and stalagmites. A mere earthquake would have left its mark—but the entire stopping of the Earth did not.

And none of this needs to be changed?

Anyone who can swallow this sort of thing will, of course, eagerly swallow the infallibility of the CP. Indeed, it is this infallibility that gives the followers that sense of protection they need; that strong shelter against a cruel world of rational uncertainty and insecurity.

The picture of Velikovsky drawn by his followers is of someone who knows everything; who apparently draws upon some well of infinitely mystical knowledge; who can argue with all scientists in every field and prove the superior of each.

For heaven's sake, don't think that the idolization of Velikovsky as a cross-cultural genius is something new. The same is maintained (by their followers) in connection with every eastern guru, and, for that matter, with Hitler and Stalin. Mere mortals like Newton and Einstein were, however, notoriously mistaken now and then, in their times.

And so, despite his uncritical followers, is Velikovsky, even in very simple things. His book "Worlds in Collision"—the book of which he would not change a word—shows him amply and generously ignorant of simple facts of astronomy, chemistry and physics. (I refer you to my own article "Worlds in Confusion.")

This ignorance does not bother the Velikovskians who work on the principle that one swallow makes ten thousand summers.

No Velikovskian ever grows tired of saying, for instance, that Venus is hotter than astronomers said it was. Velikovsky had said it would be in 1950; astronomers confirmed this beyond doubt in 1962 when Mariner 2 passed the planet.

The question is, however—does Venus's high temperature establish Velikovsky's theory all the way? Does it demolish current astronomic views and leave astronomers with pie on their faces?

Well, let's see. In 1950, astronomers knew virtually nothing about Venus's atmosphere and, in estimating its surface temperature, they assumed Venus's atmosphere would behave somewhat as Earth's did. They allowed also for the heavy cloud cover and decided that while Venus was closer to the Sun than we were and would therefore be warmer than we were, it wouldn't be excessively hot. It was a fair enough conclusion on the basis of what was known and what could be reasonably guessed.

Velikovsky, however, said Venus was hot because it had been spewed out of Jupiter only a few thousand years ago.

In 1962, it turned out that Venus was much hotter than had been expected, but at the same time, the

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Venus-probes picked up information concerning Venus's atmosphere. It turned out that that atmosphere was nearly a hundred times as dense as ours and was made up of at least ninety percent carbon dioxide.

That much carbon dioxide sets up a runaway greenhouse effect, something understood by scientists since the beginning of the century. If the details of this atmosphere had been known in 1950 then astronomers would at once have judged Venus to be very hot.

Velikovsky's prediction was based on the Jupiter-origin of the planet. The astronomer's findings show the heat to be amply and easily explained by matters that have nothing to do with any Jupiter-origin. So, in fact, Venus's heat is a point *against* Velikovsky rather than for him.

Still, Velikovsky *did* make that prediction, and that just shows that it is difficult even for the most confirmed CP to write entire books without making some lucky hits. Do you think Velikovsky was the first to hit on a fact by accident? Do you suppose that one lucky hit, or five more like it, turns an entire tissue of folderol into gospel truth?

If you really think so, let's consider other cases. In Jonathan Swift's "Gulliver's Travels," Gulliver visits Laputa and finds that its astronomers have studied Mars with a telescope better than any in Europe and have discovered its two moons. These two moons Gulliver described with amazing accuracy, as real astronomers found out a century and a half later when *they* discovered them.

Well, then, because Swift accurately predicted the Martian moons in "Gulliver's Travels," will you accept the entire book? Will you accept the existence of six-inch Lilliputians and seventy-foot Brobdingnagians?

You may argue, of course, that "Gulliver's Travels" is only fiction, but how do you know? If you read it, you will find it is more soberly told, in more consequential detail, than "Worlds in Collision" and hangs together better. Maybe the tale of its being fiction was imposed on the world by a vicious scientific orthodoxy. Think it over. If you accept Velikovsky now, you might accept Swift, too.

Or suppose we go into the world of legend—

No matter how many tales Velikovsky can adduce which can be made to refer to mysterious cataclysms in the past, I will find you ten times as many tales of talking animals—and much more clearly and openly described.

I doubt that there is a culture that hasn't told such tales and I think I would be fully justified in maintaining (by Velikovskian reasoning) that this must mean that animals somehow communicate on the human level and did so openly in the past. For some reason, they

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now refuse to do so and mankind, through collective amnesia, has forgotten all about this except for traces left in myths and legends.

—Naturally, even some moderns seem to remember, through some vague racial recall. As late as the 1920s and 1930s, Hugh Lofting, in his incomparable Dr. Dolittle stories, clearly describes the pre-amnesia situation. Do you suppose he may have been a Velikovsky-type who wasn't aware of what he had?

I am serious! The arguments in favor of animals communicating on a human level by calling upon myths and legends, are of precisely the same type as (and infinitely stronger than, in my opinion) the arguments in favor of Velikovskian planets bouncing about the Solar System just in time to help the Israelites escape from Egypt and conquer Canaan—and affecting the Earth catastrophically, without, somehow, affecting it so anyone can notice.

Hugh Lofting, at one point, has Polynesia the parrot explain to Dr. Dolittle that animals do not necessarily communicate vocally; that one must watch the slightest gesture they make, for these gestures are packed with meaning. That was about 1920.

Fifty years later, it was discovered that chimpanzees could be taught to communicate surprisingly well by gesture. —I consider that prediction of Lofting's more amazing than Velikovsky's guess at a hot Venus.

And on the basis of one swallow making ten thousand summers, are you now ready to go from chimpanzee sign language to an acceptance of the entire Hugh Lofting thesis that animals do communicate on the human level? Are you ready to accept the legends of talking animals and assume that in the past men and animals were on an intellectual par and that somehow men have forgotten this.

Why not—if you are a Velikovskian?

Another characteristic of the CP is his high selectivity when it comes to evidence.

The Velikovskians range over the entire corpus of myth and legend, selecting those portions which can be made to fit the theory. Where the fit isn't clear, it can be made clear by an *ad hoc* metaphorical or poetical explanation or even, as a last resort, by adjusting the legend.

In "Worlds in Collision," Louis Ginzburg's volumes "Legends of the Jews" are treated very seriously. This is a wild farrago of tales based on the Bible which were invented by medieval rabbis to edify their readers and to make some points in ethics and morals. Their historical validity is about the same as the medieval legends of the saints. I urge everyone to read as much of Ginzburg as he can stand and estimate for himself the

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reliability of anyone who takes them seriously as a bolster to a presumably-scientific theory.

Yes, you may argue that Schliemann took the "Iliad" seriously and found Troy. Yes indeed, but if you subtract from the "Iliad" the Olympian gods and goddesses, you have a sober and rational poem that is honestly detailed and self-consistent. And when Schliemann discovered Troy, no one suggested that that discovery proved the existence of the Olympian gods and goddesses. One swallow does not make ten thousand summers.

Velikovskians also display a high selectivity in their approach to the findings of science. Although they loftily ignore or deny the very basics of astronomy, they seize with loud cries of delight any scientific discovery they conceive as fitting their theories, even when those discoveries are founded on the basics they deny and would be meaningless in a Velikovskian Universe.

Furthermore, if some scientific datum can be misinterpreted to fit the theory, this is done, too. The Velikovskians misinterpreted an early report on Venus's atmosphere, and conceived it to indicate that there were hydrocarbons in that atmosphere, which fits Velikovskian theory. Actually, Venus's atmosphere does *not* contain hydrocarbons as we know by many lines of evidence, including Soviet probes that actually entered Venus's atmosphere and sent back information from within. It doesn't matter. To Velikovskians, Venus's atmosphere is still hydrocarbon in nature—theory ahead of fact, in other words.

But then (as I have sometimes been asked by naive questioners) if Velikovsky's theories are so CP in nature, why do so many people accept them as true—or at the very least, as possibly true?

The easiest answer is to say that the fact that so many people are fascinated by it is but one more reason for suspecting CP-ery. If we were to settle questions by popular vote, the most astounding follies would be voted in by a landslide.

There is not a CP notion in the world that doesn't attract many adherents—a majority, probably, of those who think of the matter at all. Most people suspect there's something to flying saucers, and to ghosts, and to the evil eye, and to astrology. In fact, if I were to spread the story that the Moon was made of hamburger and onions, I daresay I could work up a large body of followers.

But in addition to the large body of people who are naturally attracted to CP-ery and ask only that some belief be foolish in order to be ready to die for it, there are some more nearly musical strings plucked by the Velikovskian theory that attract some otherwise quite intelligent people.

First, there is localism, or the I-

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am-better-than-thou syndrome. If one reads not merely "Worlds in Collision" but the entire corpus of Velikovsky's books, including most particularly "Ages in Chaos," it is easy to see that he is a Jewish nationalist.

"Ages in Chaos" so rearranges history as to make it seem that Israel, prior to 1000 BC, and in the time immediately afterward, was not the petty and barbarous little state that the "conventional" (*i.e.*, real) historians think it to be, but was a great power on a par with Egypt at its height.

The events described in "Worlds in Collision" fit in with those in "Ages in Chaos" and the whole, taken together, are a glorification of the Jewish role in history. Needless to say, however, Velikovsky's historical theories are taken no more seriously by real historians than his astronomical theories are by real astronomers.

It is understandable why Velikovsky should take a Jewish-nationalist stand. He is, after all, a Jew (and so am I, by the way) and his theories were developed in the aftermath of the Nazi holocaust and the establishment of the modern state of Israel. Both the horror at the holocaust and the pride in the new nation would tend to stimulate a new look at Jewish history and an attempt to revise it in such a way as to raise the prestige of a long-downtrodden people.

I understand, I sympathize, but, alas, understanding and sympathy do not convert nonsense to sense.

So though Velikovskian theories may attract many Jews who find it pleasant to believe that their ancestors were more important and successful than had been supposed, that is no testimonial to the worthiness of the theories. Rather the reverse, I should think.

Let me give you an example. Back in the Seventeenth Century, there dwelt in Sweden a naturalist named Olof Rudbeck, a highly-educated classical scholar and cross-disciplinary polymath. He made some important discoveries and in 1653 was the first, for instance, to detect and study the lymphatic vessels.

He had, however, a quirk. He believed in the existence of Atlantis and published a work in several volumes on the subject; a work in which, in the most scholarly manner, he attempted to pinpoint the location of Atlantis, which he considered the fount of human civilization.

Guess where Rudbeck found Atlantis to have been located? Guess what he thought was the fount of human civilization? Sure—Sweden!

Of course we might suppose that Atlantis *had* existed, and that it *had* been located in Sweden. Would that become untrue just because it was a Swede that discovered the fact? No, but in the absence of hard evidence, it's just a little more difficult to believe a theoretician if

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one must wonder about national bias, that's all. And we can feel quite safe in supposing that a much larger percentage of Swedes than of non-Swedes felt there was something to Rudbeck's theories.

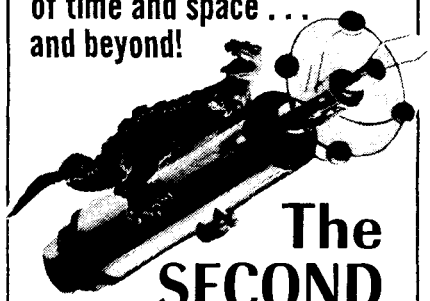
I think the analogy is clear.

A second cause of Velikovsky's popularity involves religion, or the "let's-not-get-God-angry" syndrome.

Even in this comparatively free-thinking age of ours, most free-thinkers were subjected, at least in their childhoods, to the religious view of the Universe. They go through a childhood in which they accept what they know of the Bible literally (I am talking of members of the Judeo-Christian world) because that's what they are taught by their parents, churches, temples, Sunday-schools. Nor are public schools allowed to disabuse them in their younger years. Even free-thinking parents are generally reluctant to indoctrinate their children too soon lest the little blabbermouths get in trouble with the neighbors and the school authorities.

This means that most free-thinking adults, perhaps all of them, have had to break away from a religious view, and many of them feel a little guilty about it. It is difficult to feel *entirely* confident that one might not wake up in Hell some day, shrieking, "Oh, my goodness, I was *wrong!*"

To the farthest boundaries of time and space . . . and beyond!



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Then along comes Velikovsky and he tells you that all those miracles in the Bible are literally true. Water did turn to blood, and manna fell in the wilderness, and a pillar of smoke and a pillar of fire led the children of Israel through the wilderness, and the Sun stood still in time for Joshua's army to win its battle.

You can go back to believing the Bible! What a relief! What's more, it's all "scientific" which makes it all very intelligent.

Of course, from my cynical free-thinking standpoint, it seems that the existence of God and the supernatural miracles is both more likely and more glorious, than the nonsensical Velikovskian view of

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the Universe. Furthermore, if you're going to offend God and go to Hell by not believing all those miracles—you are going to offend God even more and reach a hotter circle in Hell if you *believe* in those miracles, but as natural phenomena only, and choose a nonsensical theory of natural phenomena to do it with. An honest atheism based on sound science may be punishable by Hell, but a twisting of the straightforward Biblical story into nonsense-science—wow, will *that* get God mad!

However, I don't suppose Velikovskians are any better at theological subtleties than at astronomical ones.

Then, too, there is the competitive, or "you-don't-know-so-much" syndrome.

Remember that the hard scientists make an excellent target. They deal with those aspects of the Universe sufficiently simple to allow hard and fast laws to be established. Their work has a great deal of predictivity and has produced astonishing results. That gives them a lot of prestige, and rouses envy.

On the other hand you have all kinds of other scholars who are in the soft-sciences and the non-sciences; whose fields are too complicated to be expressed in simple laws; who can produce nothing in the way of results and can only talk to each other.

The sociologist or the literateur, for instance, doesn't have the prestige of the hard-scientist or (in the 1950s and 1960s) the government grants, either. The soft-scientist and the non-scientist don't make news.

It's only natural for some scholars in the fields outside the hard-sciences to greet with glee the possibility that astronomers and physicists don't-know-so-much, and are pleased that one of their own (a psychiatrist, as nearly as one can make out) has upset the hard-scientists. It is not surprising that sociologists and other miscellany of the sort have been in the forefront of the Velikovskian movement.

Well, then, what should be done about the Velikovskian movement?

—In ancient Greece, Heraclitus of Ephesus was known as the "weeping philosopher" because he wept over the follies of mankind. Democritus of Abdera, on the other hand, was known as the "laughing philosopher" because he laughed at the follies of mankind.

Ever since, one can choose either to weep or laugh at folly.

Over the follies that are leading mankind to destruction through over-breeding and through the continuing rape of our lovely planet, I can do nothing but weep.

—But over such meaningless nonsense as the Velikovskian theories, no one without a heart of stone and a brain of lead can do anything but laugh—and laugh—and laugh. ■

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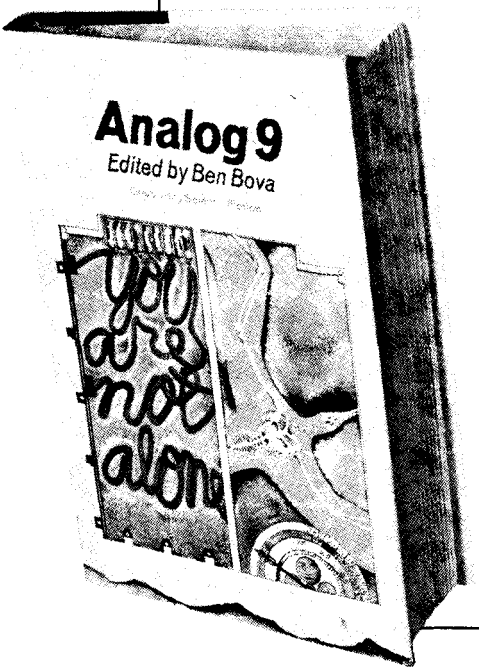

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gone with the GODS

There are many inventions you never hear about because no one has found a good use for them.

ANDREW J. OFFUTT

I was gagging my way through the day's third Gothic novel, trying to get myself into perpetrating one of the damned things so some artist could perpetrate another cover with an uptight-looking young woman in the foreground and a castle or old house in the background--with a light in one window. It was one of those times when any sort of interruption was welcome, even a ringing phone.

The phone rang.

I bounced "The Castle of Malfoie" off the far wall and reached for a cigarette with my right hand. My left went after the phone. I am totally incapable of handling a telephone without a cigarette. I try to control the nasty things, but on

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those days when I have to answer and place several calls, the tobacco industry gets a break. And I wake up next day with a throat like a piece of old harness leather.

"Hello, this is Harvey Moss," I said, wiping a book of matches off the desk.

"Harvey sweetheart, howsa boy?"

"Doing my damnedest to get into an Otranto mood, Mark," I said, with plenty of put-upon weariness in my voice. Mark Ventnor's voice, naturally, was one I recognized instantly. I hunched my left shoulder to hold the phone against my ear while I tore off a match and lit up.

"Otranto? Otranto?"

I sighed smokily. "The granddaddy of all Gothic novels, Mark. Very old novelette, by a gent named Walpole, may his soul sizzle sickly!"

"Oh yeah, oh yeah, *that* Otranto," Mark Ventnor said in that raspy high voice of his. Sounds like Ed McMahon doing W. C. Fields, sober. With a cold. And about to cry. "Well, forget that Gothic jazz, Harvey sweetheart. I got something I need you to do."

"Last week you needed me to do a Gothic," I reminded him. "By the first."

"That was last week. I just had a really weird phone call, Harvey. A really odd call."

"Me too," I muttered, "this one." More loudly I said, not without trepidation, "Tell me about it, Mark."

"Yeah. Listen Harve, I just had a call from an old fraternity brother of mine, Dr.–"

"Hey, I never knew you were in a fraternity," I said, reaching for the ashtray and not quite making it. If it's true that ashes are good for rugs, I should keep one on my desk instead of a blotter. The ash is always longer than it should be; the tray is always a few centimeters too far away.

"Uh yeah, yeah, I was," he said, half blown away by the interruption. "Sure I was. It was a long time ago," the cueball-headed boss of Morpheus Books added unnecessarily. "So an old fraternity brother, Dr. Ben Corrick, called me today."

"Marvy," I said, "and you want me to ghost a book about his earthshaking new diet plan, right?"

There was a brief accusing silence, heavy with hurt. Then: "Harvey, this call is costing me money. It's my nickel, remember. Things are not so good I should listen to you shoot off your mouth every time I open mine–and before I close it. I–"

"Right, Mark. Sorry."

I heard his sigh. Oh Lord. I'd done it again. I resisted apologizing for having interrupted to apologize. The silence just sort of sat there for awhile, surly.

"Ben Corrick isn't a medical doctor," Mark said in the manner of the teacher in a retarded-I-mean-exceptional class. "He has one of those PhD's. You know. In physics.

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Like . . . ah, you know, physics. He's stayed on at the old school all these years while I've been working my ass off up here in New York, and he's been working on an *invention.*"

I curbed the automatic impulse to comment. An invention. Oh boy.

"You still reading all those hard-core science articles the way a kid reads funnybooks, Harvey?"

"Sure. What's the invention?"

"Well, see, he's had this grant, he and his department. But he's been at work on a private project for years too, see. He calls it a, ah, temporal traverser."

"A temporal traverser," I echoed, dry as the landscape around Sinai.

"Right," Mark said, with escalating excitement in his voice. "D'you think it's possible, Harvey?"

"The word 'impossible'," I said, "won't be in Webster's Fourth. But how do I know, what's it supposed to—a *temporal traverser?*"

"Right!"

"Mark? Time travel?"

"Right! Right!" I could practically see him and his belly jiggling up and down in his excitement.

"You sure he's not putting you on, Mark?"

"I don't think so, but that's what I want to find out, Harve boy. Can you get over to Chinchilla, Pennsylvania and find out for me?"

"Can I—you sending me a plane ticket, Mark? *Chinchilla!*"

"I'll cover it, Harvey. Just try to hold it down, OK? Times are hard."

I ignored that. Mark Ventnor is a hyper, not to mention a shucker. He is also publisher, president, editor, and bigot-in-charge of Morpheus Books, which he founded. He's tried dozens of times—literally—to get a really Big Book out there, opportunistically, exploitatively jumping aboard every topical express to come down the track. It's never happened. I know; I've written most of the books for him. And so Mark sings the blues, constantly—although the old phony *does* have money. Part of the reason is he hangs onto it the way fans hoard old magazines and books. I know. I've done fifty-seven books for Mark Ventnor in the past six years, with advances ranging from an embarrassing-to-admit seven hundred and fifty dollars to a decent thirty-five hundred, using eleven pen names. Subject matter has been very broad indeed: attempt after attempt at get-rich exploitation, each about as effective as government economic plans.

Not one of those books has ever sold enough to earn me any royalties beyond the advance. Or so Mark Ventnor says, anyhow, and he's the one with the ledgers. And his mainstay, a seemingly endless stream of Gothics. They *sell.*

And now I knew we were off again.

But Mark was talking. "You know how academic-types are,

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Harve, Ben had a, ah, little accident. They, ah . . . he isn't with the university any more. And he—"

"A little accident?"

"Ben'll tell you all about it, Harve. Dr. Corrick. Just get over there. I've got money at stake."

So then, while I lit another cigarette, Mark Ventnor dropped the rest of it on me.

There'd been a fair crowd on hand the day Dr. Ben Corrick was at last ready to demonstrate his device. He explained, re-explained, blinked, and finally closed the switch. Nothing happened. He then went across the big lab-sort-of room in which he'd constructed his . . . Thing. And he plugged it in.

Fortuitous, his being on the other side of that big room. The temporal traverser did absolutely nothing for a moment or so. Then it removed, in a manner most noisy, the better part of the south and east walls of ivied old Smoire Hall, not to mention a large assortment of glass items in the surrounding area.

The t.t. was not amid the rubble.

Shamed, castigated, attacked, called charlatan and worse, Ben Corrick, PhD, was forcibly sabbaticalized.

Now, months later, he had called his old fraternity brother. The working model of his Mark Two t.t. was nearly finished. But his bank account and savings were *totally* finished. All he needed to finish the device was another ten thousand dollars. And everybody knows publishers have lots of money.

Ventnor didn't have to tell me that he then relieved himself of a sermon on money, inflation, hungry writers and grasping, incompetent distributors, inflation, prices, union printers, inflation . . . and so on. I'd heard it several times from Mark; it's improved signally since the advent of the recent unlamented Administration.

But somehow Ventnor succumbed. Somehow Corrick persuaded and convinced him to check out the temporal traverser, at least. And so Mark Ventnor, actually giving consideration to parting (after due tearfulness and lectures) with ten thousand clams, told Corrick to hold tight. And Mark called in Harvey Moss.

Me.

I'm a writer. It's all I do. I make a living at it and from it. There are several ways that can be done. You can write a book about a garbage-eating bird with a sixth-grade philosophy, for instance, and be rich forever because that's one grade above *Reader's Digest* readers, who are easily impressed. Or do a sort of fact novel about a couple convicted murderers, and be rich and drop names forever. Or you can write science fiction, and stay hungry. You can perpetrate Gothics for whoever it is that reads them, and know that every word you write will sell, instantly and easily.

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Or you can do what I do. I make a nice comfortable living the same way the A&P does: on volume. I write a lot, and I've never been late for a contract deadline. Fifty-seven books for Ventnor in the last six years, as I said, and all on time. Dependable, that's me. Always dependable; a pussycat. And always hungry. OK, I admit it: I have the usual booze 'n' broads habit. Sure, writers get groupies; writing's almost show biz, you know. And we have to get down at the end of a day, after hyping up on ideas and coffee all day. So—broads and booze, right? It cuts into the old finances.

I've also written some decent science fiction, and I read pure science articles just as Mark said, constantly. Presumably, then, I know a few things. Certainly to a guy like Mark Ventnor, who knows *very* few.

So he called to sic me onto Corrick. To study his notes and his schematics and to look at the Thing in the garage behind his Chinchilla, Pennsylvania cottage, and to make a judgment, and to report back to Daddy Warbucks Ventnor in Manhattan. He would then decide whether to risk ten of his thousands on Corrick's alleged temporal traverser.

Flattering? I guess so; Mark trusted me and my knowledge. Also a drag. After all—a *time machine!* Didn't John Campbell prove the total impossibility of time travel?

But . . . maybe, I thought, there was a science-fiction idea in it, and that would beat having to do the damned Gothic, since I'd written only one book in the past five weeks. I was in great need of something to do a book about, and Gothics are icky, and writing pornography always makes me so damned horny!

So I journeyed to the town of Chinchilla, Pennsylvania to meet a kook named Corrick, Benjamin A., PhD, and listen to his nonsense, and tell Mark Ventnor what he should have known to do in the first place: save his ten thousand. Or give it to me as an advance to go and interview Clifford Oiving.

But that wasn't the way it turned out.

First I met Dr. Ben Corrick, who was a "call-me-Ben" sort of guy you couldn't dislike if you tried. About Ventnor's age, with hair, less weight, more wrinkles. Somehow he managed to look baggy and wrinkly and rumpled even in doubleknits—the trousers pockets stuffed so full of this and that they resembled army fatigues. Quite a bit of reddish hair, curly, above a high forehead that was obviously a lot higher than when he and Mark Ventnor had been fraternal brethren together. His blue eyes were of the sort usually called watery, set in a pleasant-enough face, almost a boy's face.

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He was the sort of man you liked the moment you saw him. I had to remind myself to maintain a scientific attitude, to treat him not as a friend but as a charlatan.

But he wasn't. I studied, I pored, I re-studied and asked questions. Examined and re-examined the stuff in the garage. The temporal traverser, he called it.

And so did I, finally. I said so, to Mark Ventnor. He acted incredulous, but his delight and excitement glowed through the careful, questioning attitude like the sun through closed venetian blinds.

With Corrick practically having signed away his birthright (not to mention his burial plot, thus including his deathright as well), Mark Ventnor financed the project he dubbed *Project Fugit.* And time fled, while Ben Corrick worked away at finishing his brain-baby and while Mark Ventnor worked away at plotting, designing his Grand Scheme—to be rich and famous at last.

Me? To stay in money, I wrote "The Castle of Brandywine," gagging all the while. I had to cut the scene in which the hunchback raped the kitchen maid, too.

"The traverser," Ben Corrick told me in that strangely near-breathless way of his, "is ready for field-testing."

I blinked. "Ready? Really ready?"

He nodded, maintaining his solemnity despite the twinkle in his eyes and the smile that was trying to tug at each corner of his mouth. "It's really ready, Harve."

"And this time," I said, grinning, practically rubbing my hands together, "you're gonna do it from *inside,* hm-m-m?"

"Definitely! The other time there was the explosion, of course, and then the remote failed to work. I am convinced that the machine did work, and properly. That's why there was no sign of it amid the debris."

"Um. But suppose something goes wrong, Ben. You're a certified genius. You've got no business inside that thing before it's tested."

"It's *been* tested," Ben assured me. "It's lost somewhere, the Mark One. I mean, *somewhen.*"

"And it doesn't have to be plugged in, anymore? I mean, if you want to go back and have a talk with Ben Franklin, you're going to play hell finding a wall-plug!"

"Of course. And now we hire a truck and take the temporal traverser, Mark Two, out for its field-test."

"Out?" I gave him a brows-up look. "Out? What do you mean? Out where?"

Ben Corrick smiled his boyish smile and made an uncharacteristically extravagant gesture. "Out into the open. Into a *field,* where else?" His watery eyes studied me, waiting anxiously for my reaction.

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I saw that, and then I saw his joke. "*Field*-testing! In a field!"

"Of course."

So we got the truck, a big flatbed. And we got a couple of guys to help us load the t.t., although they were sure we were cracked wide open. We didn't tell them what it was. As a matter of fact we told them it was a kloosh; ever heard that old joke?

Then we drove the temporal traverser out into the country, off the highway onto a back road, and off the back road into a field, scaring the beak off a matronly bobwhite. The field was full of timothy that rose about halfway up my calves.

I was still frowning, having doubts, prickly in the armpits, when Ben entered the temporal traverser and buttoned up.

The t.t. Well, Ben had a real brainstorm this time, so as not to be too obtrusive when he materialized in the distant past or future. Very clever of him, really—and besides, he needed a power-source at hand. So he had built the temporal traverser into a yellow VW squareback station wagon. Lots of space in those things. It could even be driven.

But he wasn't driving it now. I waited, standing well back. Holding my breath, having palpitations. Staring at that yellow car atop the big red flatbed truck he'd insisted on, just in case the VW couldn't be driven back. Happy thought! He was certain, he said, that the t.t. would move from surface to surface, not materialize elsewhere some five feet off the ground and drop with one hell of an impact. I hoped he was right. What if he came down on a cow, I thought, and started to yell, and—

The explosion knocked me off my feet. It was the shock more than the shock *waves*, I feel sure. But it *was* a shock, and physical force or not it was just as effective as had it been shock wave. I went down, and now my heart wasn't palpitating, it was pounding. Once I got myself sort of untangled and looked, there was the truck. It appeared to be OK.

But there wasn't any VW on it.

"Well I'll be damned," I muttered. "He must have done it. He must be traveling in time. Darn . . . I didn't even think to ask where he was going. I mean when."

I glanced at my watch. During that glance, the VW reappeared. I stood frozen until he stepped out, beaming.

I blurted, "Are you all right?"

Sorry. It was the first thing I thought of. I realized I could have said something brilliant, such as "Mr. Watson, come here, I need you." I just hadn't thought about it in advance, as Neil Armstrong so obviously had. Or as Ben Corrick had done:

"One small step for mankind," Ben Corrick said, "one giant step for science." Then, "Of course I'm

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all right. I only went to tomorrow. Look at this."

"Oh brother," I said, commenting on his first words, not on what he showed me, although it was worth no fancier comment. I frowned at it. "A button?"

Corrick nodded vigorously. "A button. Look familiar?"

No, but he soon showed me that it appeared to match those on my jacket. That didn't seem to prove anything, and I said so.

Ben blinked. "It proves that I went into the future," he said, dipping a hand into one stuffed pocket of his ever-baggy pants, "and brought you back this button from your coat. It was lying right there on the ground."

I checked. "Ben—I think we ought to be dancing, screaming, getting drunk, whatever. Instead we're standing here talking about a damn button—and there aren't any buttons missing from my jacket!"

"Of course there is, Harvey," Ben said, opening the knife he'd brought out of his pocket, and he cut the lowest button off the front of my coat.

"Hey!"

Smiling, Ben dropped the button into the grass. "I'm putting it there," he said, "so it'll be there tomorrow. And then I walk over from the temporal traverser, bend over like this, and pick it up." He straightened up to show me the two buttons in his palm. They appeared to be identical.

"Be damned," I said. "But Ben . . . this . . . this isn't *proof.* I mean . . . you could have, you know—hell, you're a scientist. This isn't any sort of scientific proof."

"Do you mean to stand there and—" He broke off. "You're right," he said slowly.

So he thought a moment, and then told me to take out my wallet and drop it on the ground, and I did, and off he went again, while I stood there and did as I was told: I stared at my wallet, lying there in the tall grass in the middle of someone's field of timothy. The wallet didn't move. Then Ben was back, and walking over to me, and handing me my wallet.

It was mine, all right. And it was still lying down there at my feet, too.

"Condition's not as good," Ben said as I examined it, "since it spent the rest of the afternoon and tonight here on the ground, and then got covered with dew tomorrow morning, which the sun baked off. And kept on baking until I picked it up."

I went through my wallet. The new one. I mean the second one; $wallet_2$. I now had two of everything. Very convenient—but the currency with the identical serial numbers, I thought, could be pretty dangerous. (Also a tempting way to "make" money. Put a wad of it down. Go to tomorrow and bring it back. Again . . . and again . . . and again! If there's a paradox

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there, I'm not going to worry about it. I can see that it *could* be the money that folded itself, somewhere up the line.)

I dropped the wallet beside its look-alike and hugged Ben Corrick. We danced around a little, and then I asked if he'd mind just going around again and picking up my wallet *earlier,* before it got ruined. Ben stared at me, then started laughing, and I realized how chickenshit ridiculous I was being, under the circumstances—the circumstances being that he had just successfully traveled in time—and we hugged and whooped and did our jig again.

We had ourselves a genuine bona-fide certified card-carrying *time machine!*

Ben went around again, as requested. Handed me my wallet again. (The second one vanished, with a minor bang.) I was still left with two, but he pointed out that I had to leave the original lying there. So it would be there for him to pick up tomorrow. Because he just had. Twice.

"What if I don't?" I asked, feeling sly.

"Please, Harvey."

"Right," I said, in manner businesslike. "Now what about next week, or next year, Ben?"

Ben tried, but this time he came back crestfallen. The VW wouldn't go past tomorrow. So then he went back to yesterday. That worked out, and he came back just fine. But he couldn't make the day after tomorrow. Or next week or next year; nothing past tomorrow.

Don't bother asking why. You can play with that sort of thing, theorizing, all day and into the middle of next month. Yesterday is there to visit, because it *was* there, remember? So we can go back to it. Tomorrow? I don't know. Maybe it follows naturally out of today. But the day *after* tomorrow just isn't there yet. It hasn't happened. Maybe it can be *changed,* which is why we can't go there (then). Because it is subject to change, and thus doesn't exist yet.

Buy it; you like the concept of freedom of choice, don't you? Would it be there if we could visit the future?

"Well," I said, a little dry in the mouth, "there went a lot of marvy get-rich-quick ideas! OK Ben, it's time to . . . find out, right?"

Ben and I stood there in the middle of that field of slightly-waving timothy, looking at each other. He blinked those pale, watery eyes, stared another couple of seconds into mine, and turned away. He waded through the timothy, and mounted the truck, and got into the VW. Then he and that strange VW wagon went away: *Bang!*

I squatted down and gazed at my wallet while I waited.

That was the explanation for the unfortunate, precipitate, and lamented demise of the south and east walls of poor old ivied Smoire

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Hall, I mused. The bang. Thunder. Suddenly there's a VW-sized hole in the air, and the air rushes in to fill it. *Bang!* He had thought of that, and that's why we were way the hell out in the middle of this field. Shaking up birds with bang after bang.

Then Dr. Corrick returned, obviously able to return to the same moment at which he'd left if he really wanted to, fine-tuning. He bore five *comic books.* Five, no less. All newsstand fresh, all identical: the June, 1938 edition of Action Comics.

Chortling, he explained. "I thought I might as well bring some *worthwhile* proof," he told me triumphantly. "This is the origin of Superman issue! Each is worth a thousand dollars or more, in mint condition. And believe me, Harvey—these are in mint condition!"

The sound I made is what is known as a Comanche yell.

A few more little experiments taught us a few more little things. For one, there's a weight-loss, a nigh weightless factor in trans-time movement. Let's don't go into too many details, but Ben and I learned that the VW could transport enormous weights, so long as it was timejumping.

(Time-travel, Ben had postulated and now proven, is inextricably bound up with $\bar{c}$ and $e=mc^2$. That led me to point out that since we got it all together out in the middle of a field, we had proven the Corrick Unified Field Theorem.)

He did have a hard time selling those comic books, by the way. They were *so* perfect, so new, that dealers were decidedly wary. But he sold four of them at last—keeping one because he just couldn't "bear to part with it"—to some hotshot dealers out Dallas way. Some people kept insisting that those guys had been taken, and there was a lot of chatter in the dealers' magazines for awhile, about the Dallas con.

We let a hyper-excited Mark Ventnor know what we'd done, and he came down to Chinchilla to see, and then to try out the temporal traverser (which Ben and I by now referred to simply as "the vee-dub").

Mark came back from his fourth jaunt into the very distant past very shaken indeed. He had visited a consummately ancient gent named Abram, the same who later changed his name to Abraham. Much impressed, he indicated to his visitor that he was invited to dinner.

"Mutton?" Ben asked.

Mark nodded, frowning, unable to speak.

"Wow," I muttered.

Ben was obviously deep in thought about something else. At last he said, "But how is it that we can travel in time without covering enormous astronomical distances as well?"

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Mark stared at him, frowning.

"Uh . . . we've proven that we're all tied up with $e=mc^2$," I said. "So . . . we *do* cover enormous astronomical distances. At faster-than-light speed."

Mark stared at me, frowning.

Ben made a helpless, somewhat anguished gesture with his hands. "Perhaps—but if we've discovered FTL, it *isn't* taking us anywhere. We stay—or return to—Earth. Look, Harve . . . our Sun is moving along—*and* dragging the Earth with it—at something like two hundred kilometers a second."

I nodded. "OK. A little over four Astronomical Units a year."

Mark stared at us, frowning.

"That's right," Ben said. "Four-point-two AU's, to be a bit more precise. So. Using a rough value of a hundred million kilometers for the AU . . . in, ah, say ten thousand years we've traveled *nearly a light-year!*"

I thought about that. "Meaning . . . if we go back ten thousand years, why the hell weren't we some four-point-two times, ah times . . ."

". . . times ten to the twelfth," Ben supplied.

Mark stared at him, frowning.

"OK," I said, nodding. "But we *weren't.* So . . ."

"So we don't know all there is to know about what we're doing," Ben said quietly, and not without sadness. "So we're engineers, not scientists. We're doing it, but we don't know how and why!"

"Maybe, uh, gravity," I said, knowing how lame that was. But at least it was a comfortable scientific word. There's security in labels; so long as we can tack a scientific-sounding tag on it, we feel a lot better. Awhile back it was witchcraft. Now it's science. Come to think, both witchcraft and scientific problems tend to yield to the same sort of solution: a lot of Latin words.

Mark frowned at Ben, staring. "What are you two chattering about?"

"Mark," I began slowly, "you just went back into time a long, long way. Since the Sun and therefore the Earth are moving, all the time, we figure you shouldn't have, ah, 'landed' on Earth at all. You *should* have wound up somewhere like 4.2×10^{12} kilometers away from the Sun's position."

"My God," Mark said, staring and frowning.

Ben nodded. "Uh-huh. Is that what Abraham said?"

Maybe that was what gave Ventnor his Idea. Certainly he could have become rich merely by journeying relatively short distances into the past and bringing forward more comic books, postage stamps, or silver dollars. Or betting on derbies, fights, and ball games. But that wasn't how he chose to make his mark. And what Mark chose to do was *it.* As noted, Ben Corrick

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did tend to overlook little things. Such as the fact that the temporal traverser was no longer his, but the property of Transtempus, Inc., seventy-three percent of the stock of which was owned by Marcus D. Ventnor. And Mrs. Ventnor.

Mark Ventnor overlooks damned little.

First we added the heavy-duty cables and huge sled-like runners to the veedub, making it resemble a bright yellow forklift with pinache. That way, timejumping, it would be able to transport about anything.

Then we liberated the new device that Westinghouse developed for NASA, to use in space; an electron beam generator or "gun." It was unfortunately too expensive to buy, but judicious use of the temporal traverser solved that problem. It is a great mystery, how the e-beam generator, Mark Two, just *vanished* one fine night . . . and was back in place by the time the watchman came arunning with the two superiors he'd run for.

How does something vanish for ten or so seconds, then reappear? And particularly when I tell you that I used it, in this time period and that, this place and that, for several *months?*

Right!

We also equipped the veedub with a thermal drill, a truly marvelous invention.

Although he wasn't ashamed to admit he wasn't sure how/why it worked, Corrick meanwhile came up with a means of calibrating the veedub to the Earth's movements. Look, the machine was obviously somehow "glued" to the planet and thus couldn't get left during Sol/Earth's race through space. Using that as a premise, Corrick modified things so that the traveler could get from one *place* in the world to another, by time-jumping.

I practiced. And practiced some more, until I could bring the veedub down on a dime, in any given minute of time, and could practically remove a splinter from my finger with the thermal drill. Practically. I learned how to make little jumps back and then forward, to land in different areas.

It was Ventnor's ball game. He had signed a contract with me, written me out a fat check. His money covered the drill and a few other little knickknacks I'd be taking with me on my mission into the past. Yes, *I* was going. Along with the detailed instructions Mark had written out.

And then the day came, and I slid into that extraordinary VW squareback, and I was off. Into the past. The *distant* past. I was equipped with a suit resembling an astronaut's, because certainly I didn't want to spread any modern diseases among my remote ancestors. Or bring any of theirs forward to our time!

It was no lark. Using the electron-beam generator and the thermal

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drill to dig all those smooth-walled tunnels and caverns was *work,* and a drag betimes. Too, I had to keep coming back for more fuel: power source. (My favorite place and time for buying more gasoline was Louisville, in 1961. Very little attention was paid to my car; there weren't that many VW's around then, for anyone to have seen enough to realize mine was a later model. And there was more gasoline. Besides, Mary was in Louisville in 1961, and I *deserved* those periods of R&R.)

Then back I went, to create more tunnels with floors resembling trinitite. I incised some most interesting pictures and pictograms on the walls, too, while I was at it.

Then I went in search of preman. This time I was tightly suited up, and hopefully sterilized; I didn't want to be a carrier of something that would wipe out Man before he got off the ground—or rather, out of the trees and caves.

My sudden appearance and strange garb really shook up the first band of hominids I came upon. I endeared myself to that hairy host, though, after the manner of Dorothy of Kansas and Oz, by materializing precisely atop their big shaggy leader, who I soon learned had been the meanest sunuvabitch in the valley.

Bowing and genuflecting hadn't been invented then, but they let me know they were most deferential and subservient indeed. A bit obscene, that demonstration. Think of a dog, showing his deference and trust. I was just able to refrain from laughing.

My appearance and simultaneous ending of the tyrannical reign of Grunt made me both god and savior, which, I mused, would be a fine combination for religion-inventors to bear in mind in a few thousand years . . .

I made that stooped, stupid, hairy and homely lot understand, eventually and after much agonizing work that made me reaffirm my high respect for elementary teachers. But I finally got the message across to those almost-men: I wanted them to continue my drawings and carvings, and to make a few more little items in my honor. I showed them models.

Their making themselves understood to me took considerably less time. My translation of their reply goes like this:

"Check, OK, right, whatever you say, god sir."

I rewarded them: taking time out from his busy schedule, god-sir zapped them a nice big critter that looked like a super-hirsute elephant with a glandular imbalance. A very big meal, and they were most grateful. I received the homage routine again. Although I didn't need petrol, I jumped straight up to 1961. I needed Mary.

Back I went, this time dropping in on a happy-enough tribe of considerably more advanced near-

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people. Their holy-mackerel-He's-back reaction let me know that stories about my previous visit had been handed down. They were just about to sacrifice a flagrantly bosomy virgin in my honor, before I stopped them. Though I considered making better use of her, I refrained. I said *near*-people.

Getting my new and revised message across to this more-developed gaggle of humanoid geese was just as hard as last time, but I prevailed. I had to do a lot of gesturing and a lot of scratching out symbols in the dirt before, with an obvious mixture of fear and awe, they began to get the message. I worked harder, and they showed they had it all, but weren't happy about it.

Here's what I told those poor progenitors of us all, liar that I am:

"Look, I am a Good Guy from the heavens, right? I came down here to this strange world among you in my skywalking thing, old yeller over there. I was fleeing some Bad Guys, I mean real hard cases and lots of 'em, who are after me. Now I am afraid that I may have gotten all you nice handsome (ugh) folks in a bit of a spot, because those bad dudes may track me here even as one tracks the foodbeasts. So, you folks'd better stand by to dig in for swift shelter in case you need it—from aerial attack."

Now that shook them a bit, but it also sounded like work. They weren't too darned happy about the Bad Sky-people, but they weren't too enchanted with the prospect of all that digging, either.

So I "told" them a few tales about the Followers. Communication was a problem, and it took awhile. Signs and drawings and even postures and facial expressions served well, particularly inasmuch as I was obviously a god, anyhow.

Besides, I'm a writer, and everybody knows writers are brilliant and resourceful, right?

I punctuated the hair-raising tales (they raised the hairs all over the bodies of my audience) with bloodless little displays of god-power. The matches made them go goggle-eyed and back away. The cherry bombs I tossed—no, not *at* anyone—were even more effective. With the semi-automatic rifle, United States Army surplus (how can they sell these things so cheap?), I cut down a tree a hundred or so feet away. The thermal drill felled another, almost as spectacularly and far more aromatically. The small quantity of nitric acid I dribbled onto an animal-hide blanket brought more wide eyes and oohs and ahs.

Then, using the veedub and some fine and careful settings, I moved some exceedingly weighty chunks of rock. The mighty BANG that accompanied each mini-jump didn't hurt my cause any.

My demonstrations, along with

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my tales of possible followers of the inimical persuasion, served, in a few words, to shake the shinola out of them.

Besides, I showed them how to set this kid's broken leg . . .

Right willingly, they went to work.

Despite their sorrowful importunings, I departed—and "returned" a couple of years later. (Took me less than five minutes.)

"Oh-oh—god's back," their attitudes said, but I was taken on a little tour of inspection.

Fascinating. Caves and tunnels, miracles of hard work and applied genius. Interesting, though crude, drawings adorned the walls: drawings of me, in my atmosphere suit. All about them, as decor, had been traced pictogram representations of what I had scratched out in the dust in my efforts at communication. Circles for suns and planets, squiggles, beelines with arrowheads, this and that. I smiled with pride at the genius and hard work of *my people;* some of those pictures were very artistic indeed. Phidias and Michelangelo were on their way.

But their mandated labors were otherwise pretty much petering out. After all: two years, no sky people, no returning Good Guy. So I conferred with the high priest (of the Harvey Moss cult).

"Get their tails back to work on those tunnels and things," I laboriously conveyed to that pot-bellied high-rolling do-naught, "or I'll fry yours the same way I did that shrub!"

With a glance over at the burning bush, he got the message. In short order *our people* were back at work, digging and carving.

I time-jumped, returned to them one month after I'd left (a day and a half later, my time), and gave them their reward: enough fresh game and exotic fruits to feast twice their number. I let the headman fire the rifle, too, and preserved his fragile dignity by blocking him as, taken by surprise by the recoil, he started going over backward. I'm sure he wore that bruise on his weighty shoulder like a badge, and lamented its passing.

(In a cavern deep beneath what is now Normandy there is a pictorial representation of a primitive man with a stick in his hand, belching fire, and with a great dark mark carefully traced out on his shoulder.)

It was work, but I had accepted the task and it was a fascinating job and even sort of fun. Feeling like poor overworked Herakles (he was a blond, by the way, with ridiculously big feet), I repeated this labor-organizing among other tribes, widely separated from the first. I even took one headman's daughter for a time-jump, which she didn't appreciate overmuch. But she was returned to her people happy.

My next jump was a long one, forward, and I had to bounce three

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times to get to the right time and place. *That* was some big river, in those days. These people were advanced, and those bronze swords and the faces behind them looked nasty. But I got myself conveyed to their king, without having to kill or maim, and we "talked." His wife also made eyes at me. Unfortunately she looked just like him; his sister, I assumed.

A lot of short-period bouncing around in time followed. He provided the slaves; the electron "gun" and the thermal drill easily carved out huge—I mean H*U*G*E—blocks of stone. The veedub transported them to the appointed place in no time, if you'll pardon the expression. All the slaves had to do was shove those megatherian building blocks onto the veedub's runners; it and I took over from there.

Piling them up in the proper form and shape was up to them and their ugly king, who was crazy about the whole idea. I provided a few instructions and suggestions, even diagrams (on clay tablets and papyrus, both of which I knew would never survive the centuries). Thus I started those Egyptians and their megalomanic king off on a nice project: the Great Pyramid. I think they did very nicely with it.

So did the Incas and Aztecs I started on the same project a few days (and several thousand years) later. In Peru, Mexico, and Ecuador I picked up some perfectly lovely groupies of both sexes, though I assured them I suffered from a hopeless heterosexual hangup. I'd had a vasectomy long ago; it seemed the thing to do. Now I was glad—Harvey Moss simply could *not* afford to have any Inca or Aztec offspring!

I did several other things, in several other times and places, but I think I've given the general flavor and manner of it. And then, with a lot of hair and a quite respectable beard, I returned to hometime, with more projects to my credit than Frank Lloyd Wright or even FDR ever envisioned.

I spent the next two months collecting and collating material on my activities from articles in newspapers, scientific and popular journals and worse; the range was from the Washington *Post* and the Louisville *Courier-Journal* to *The Morehead News* and the *L.A. Free Press;* from the *Smithsonian* through *Escapade* and "specialized" journals such as *Fate* magazine. I said material on *my* activities. Right. Except that none of the writers knew that the strange finds were *my* works. I was at first surprised to discover a lot of things I hadn't put there. But I smiled, realizing that I—carrying out the weird genius-plan of Marcus D. Ventnor—had fostered much of what we now call spinoffs.

That required two months, as I said. Then I wrote the book, with photographs. (Oh, they're *excellent!*

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Most of them I took on location while time-tripping. They are for the most part extraordinarily clear.) The actual writing of the book was the tedious part; writing that damned manuscript took three long weeks, man, and four more to edit and type it up pretty. Good writing, as Snoopy once observed, is hard work.

I didn't have to worry about finding a publisher; Ventnor was waiting for the ms. with glowing eyes and dangling tongue. He rushed it into print, the bastard, using not the name I'd used as author—my own, for a change—but the French pen name you now know so well, Andre de Vrees. I dragged out our contract—and learned that I'd been a lot more excited about the advance and the prospect of my extended tripping into the past than ever-shrewd Ventnor. No wonder the advance had been so fat! It wasn't an advance against royalties at all; it was the sale price. Just as he owned the temporal traverser, Ventnor owned my book, totally.

You know what came of it. The book made a mint. Ventnor and the (invisible!) writer were hailed, kudoed, attacked, castigated. It was a work of genius; it was charlatanry. It was the discovery of the age; it was the work of the Antigod.

It was also bought by nearly everyone in the United States. And overseas. It was also Ventnor making the money and the appearances on Today and Carson and Cavett, not me. Then there was the big television special; one hour long and a full page in *TV Guide*. MGM bought movie rights and immediately contacted and contracted Charlton Heston to play the part of the man from outer space the book postulated had visited Earth, so long ago.

"Mark, you slimy bastard, you're RICH!" I roared at the fat, hawk-nosed, bald man across his own desk—brand new, brushed walnut. "You're *rich!* You're *famous*—dear god, why NOT share some of it with me—it was all MY work!"

Ventnor sighed exaggeratedly. "But *my* idea, Harve baby. And, as

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I pointed out to an equally screechy Ben Corrick just yesterday, *my* money financed the project. Come, look at it this way. I hired him to make it possible; I hired you to plant the evidence and write the book. And you were both paid."

"HIRED! You . . . you damned Jay Gould, I'll—"

He lurched forward in his swivel chair, so new it was squeakless. "*Don't,* Harvey. Whatever it is, *don't.* Try suing or making wild claims and I'll smash you. *We have a contract.* You've received the highest advance on a book you ever saw in your life!"

I tried not to splutter; my face felt as if I had a fever of 105. "ADVANCE! You mean PRICE! And that book's made MILLIONS!"

He shook his head. "Oh Harvey, Harvey. *Price,* then. But why quibble over terminology—when did you ever do a book that earned royalties? Come on; this is more than you ever made on a book in *your life!*"

OK, there was nothing to be done, aside from murder. I tried to get hold of Ben for some mutual commiseration; he linked me with Mark and wouldn't even talk with me. He did own twenty-seven percent of Transtempus, Inc. but unfortunately T.I. didn't publish the book. Morpheus Books, Inc., did. Transtempus had turned no profit . . .

I sat down and started whanging out a science-fiction novel, since I didn't dare do an exposé. It was about this guy who went back in time and planted all the evidence in the de Vrees book—and it became obvious very quickly that no one wanted to publish it. So I thought, and thought, and my money dwindled. Then I hit upon a unique plan of vengeance, and practically cackled, in my laughter.

It took awhile, and it took some more of my dwindling assets. But I regained the veedub, and I went back again. On a mission of vengeance. Mark Ventnor would be the biggest laughingstock on the planet.

This time I labored long and hard over an enormous statue, a crude stone monstrosity that was a caricature of big-nosed, bald, Mark Ventnor of the basilisk eyes. More hard work: I placed it on a platform on the coast of an unpopulated island, facing inland. Then I hauled Polynesian settlers to that island, trio after trio, trip after trip. You can only get so many people into a VW. And I showed them how to catch fish more rapidly, so they wouldn't have to sweat food-gathering. Thus they'd have plenty of time, and I started them to work: creating duplications of my statue. More Mark Ventnor caricatures.

It required only a few hours, subjective time, to pop back on five occasions, thus throwing the fear of, ah, Moss into them and in-

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suring that they would continue the project.

The next trick was to keep the veedub. I had liberated it from where Mark had it stashed in Manhattan. Now I set the controls carefully for two months *after* the date of my departure, so I'd materialize elsewhere. Near, as a matter of fact, Chinchilla, Pee-Ay. Then, chuckling at my colossal joke on that bastard Ventnor, I consulted the records: encyclopedias and so on. Yep! There were now *many* such stone busts on the *Isle de Pascua:* Easter Island.

So much for Mr. Marcus D. Ventnor!

Then I saw the copy of *Newstime* on the newsstand. It featured a story on the new book by Andre de Vrees, all about the Easter Island phenomena. And there was a picture of the man who must have churned out that second book, the bastard: Mark Ventnor. The miserable mother had used part of the first book's vast proceeds to get a nose-job, to root hair on his no-longer-cueball noggin, and he had raised a mustache!

I stood there staring at that picture, and I groaned. Mark Ventnor no longer bore the faintest resemblance to my Easter Island caricatures.

I didn't just nurse my wounds. I planned and plotted, again. I worked it all out carefully, and I admit to feeling like a genius. We're all afflicted—or blessed—with it at one time or another. This plan I even talked over with Ben Corrick; we were friends now, and allies.

I went back again.

Back, this time, to 1816. A bit of jockeying: June, 1816. A bit more: Switzerland, June 15, 1816. I hid the veedub pretty damned cleverly, I thought, and reached my destination in the midst of a cold nasty rain that I knew would continue for several days. And I knocked at a door, the door of the Maison Chappuis. Out back, I knew, was a vineyard and, about fifteen minutes' stroll away, the Villa Diodati.

Naturally they had to take me in. I was obviously what passed for a gentleman in those days, and just as obviously a stranger in a strange land, not to mention of passing intelligence—and wetly bedraggled, and hungry. They were all there: Mary, Claire, George, Percy, and John. Claire, Mary's half-sister and George's mistress, obviously wished we'd all bug off and leave her and her lover alone so they could continue the relationship they'd begun in England.

We didn't. We talked constantly. (George kept writing down pieces of a long heroic poem he was working on and stuffing them into his pockets. I wondered if he'd ever get all that fire-starter sorted out and pieced together.)

Mary was a shy girl (yeah, you female sexists, *girl;* she was nine-

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teen) who was manifestly content to listen to the rest of us. She exhibited the presence of a good brain though, and was well-read. Her husband and his friend were fervently interested in modern science—that is, what was modern then, and passed for science. Galvanism, for instance. No, no, not galvan*izing*. Galvanism, after Luigi Galvani, who'd died only eighteen years before. He had serendipitously discovered what he was to call "animal electricity," and learned how to create a metallic arc that caused the muscles of frogs' legs to contract so that they twitched.

The new discipline was still called "galvanism," although by the time of my visit to Maison Chappuis, Alessandro Volta had slipped paper soaked in salt-water between alternating plates of copper and zinc, and had been proclaimed a count by Napoleon, who also hung a gold medal on him.

"The point is," George said, gesturing with his glass of sherry, "that galvanism appears to enliven the limbs of the deceased. Now, might it not be possible, as some say, to impart life to the entire organism by the same means?"

John, whose father had been a countryman of both Volta and Galvani, smiled, obviously making a small effort not to sneer. "George seeks little, friend Moss; he would but revive the dead, you see."

I sighed. "I agree that it seems not too likely," I admitted. "That a body can be made to jerk does not necessarily mean that it possesses *life*. Though perhaps in future, with more knowledge and more sophisticated machinery, electricity may provide means for, ah, treating sudden death."

"Dear God," said Percy the atheist. "what a phrase!"

"What a phrase indeed," John said. "And you actually believe that someday the dead might be raised by men of medicine—using these lightning-tools of Volta and Galvani—oh, and the American, Franken?"

"Franklin," I muttered, noting

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how Mary was sitting forward in a tense posture of concentration. "Perhaps, Doctor. Certainly there are more things in heaven and earth than are dreamt of in our simple philosophies . . . and what it pleases us to call science. Meanwhile . . . it would seem the only means at hand of raising the dead is through the East European superstition . . . vampirism."

Well, George confessed to being fascinated by that subject, though just now he was into Charlemagne pretty heavily, again. So we talked on. Outside, it was a proper night for such a conversation: the wind blew and cracked its cheeks, the rain sluiced down with viciousness. Eventually Percy was nodding off, and we had to call a halt. George and John stayed the night, though I think Claire slept alone. I did.

The following night we were reminded that Percy had on two occasions penned what were then Gothic romances (of the "Castle of Otranto" school, not like the "Gothics" of the Twentieth Century): "Zastrozzi," and "St. Irvyne or The Rosicrucian." That led us to the fact that John's father was guilty of having translated Walpole's "Otranto" into his native tongue. Ah, the interconnections! I tried to tell them Ruthven Todd's surrealist tale of the boy who found himself in a sort of Erehwon and eventually turned into a Great Auk, "The Lost Traveller." They weren't much interested, though John was taken with the name "Ruthven" and made a note of it.

This night was even worse; somehow we agreed to an appropriate reading of stories of the occult. There was one about the legend of poor old Prometheus, another, "History of the Inconstant Lover," about a man whose bride turned out to be either ancient or a corpse, I forget which.

Then, all excited, George was suggesting that we all try our hands at a ghost story, or *something* supernatural. I suggested a vampire tale, with George excitedly interrupting the outline to embellish—and John assiduously making notes in his illegible physician's hand. Mary demurred; she had no supernatural ideas.

"Suppose," I said, "that a scientist of brilliant mind, a physician such as our esteemed friend here, were convinced that galvanism could be used to revive the dead—*or* impart life to a humanoid creature of his own devising!"

"There, dear," Percy said, yawning, "combine that with your fascination with Prometheus and perhaps you will unburden your sweet self of a story of surpassing horror."

So, George Gordon started his vampire story, halfheartedly, and Claire, too, started one, while John tinkered with the *wompyr* idea that was mine and George's. Eventually he wrote it, as a novella—about a vampire named Lord Ruthven, no

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less!—and for a while it was attributed to George. It was Mary, though, who commenced to skip meals and make her fingers sore, writing her yarn of "Prometheus Rebound, or The Strange Tale of Doktor Schmidt." It was I who suggested that the entire novel might be handled as a flashback. She thought that was very clever indeed, and hopped to it.

Convincing her that "Viktor Schmidt" was a nowhere name was rather more difficult.

"Why not the name of that American electricity man, Franken?" John suggested.

"Franklin," I muttered.

"Franklinson?" Claire amended.

"In German," enthusiastic George cried. "Frankenstein!"

"That's a nice name," Mary said.

At last the rains let up. I departed, with Mary thanking me profusely and all of them begging me to return. I promised.

And I did; that was part of my Master Plan. By that time, two years later, John Polidori had been canned as George's companion and tame physician and had published "The Vampyre" in London; George Gordon had abandoned his novel in favor of fitting together the scraps of paper into the third canto of "Childe Harold," which he signed Lord Byron as usual, and Mary Shelley's novel "Frankenstein or The Modern Prometheus" was doing very well indeed.

I was welcomed with open arms and bottles, naturally, and both Byron and Shelley agreed to what I wanted and had gone through the whole business to set up: personal interviews. I made sure never to goof up and let them hear any sounds from the tape recorder. Nor would Count Alessandro Volta, over Como way, have recognized its power source, the successor to the Voltaic pile and the Voltaic cell. Size C.

Once again I departed my dear friends George (or *course* we didn't call him Lord), Percy, Mary, and Claire, and let Twuman Capote top *that.*

I moved myself forward only a few years, to England in 1846. There/then, by divers devious means, I made the acquaintance of two lamentably homely and unrelentingly neurotic sisters. One thing led to another, according to plan, and each became a bit less neurotic, via method similar to that which the service station man means when he tells you your car needs to be taken out and have its carburetor adjusted.

Thus, a bit happier and more knowledgeable and having less trouble with their monthlies, at least, those two did *not* that year or any other year write the novels that were to be the progenitors of the modern flood of what *we* call Gothic romances; thus the Brontë sisters perpetrated neither "Jane Eyre" nor "Wuthering Heights."

A quick bounce up to the end of

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that century showed me that Henry James, without those books as catalysts, never thought of his novella about the poor sweet governess who comes to the mysterious house inhabited by ghosts Out To Get Her and the children: "The Turn of the Screw."

I had not only made the career of Boris Karloff, I had effectively stopped all those novels with girl + castle/mansion-with-one-lighted-window on the cover. The modern Gothic was stillborn!

My work was nearly done, except for the few weeks I took off to transcribe the notes and tapes of my conversations with Byron and Shelley.

Although we'd spent most of our time at Shelley's chalet, I called the book after Byron's, "Villa Diodati." It hath a better ring and doth fall more trippingly off the tongue.

Published in 1954, "Villa Diodati" became *the* definitive work on those gentlemen. The movie starred Robert Taylor and Tyrone Power, with George Sanders as Polidori and Grace Kelly as Mary. Though it received far less critical acclaim than the book, and certainly nothing but the back-of-me-hand treatment from academia, the movie was a blockbuster. The gross was enormous, of which my ten percent was—well, we needn't get too specific, need we?

The publishing firm I then launched, beginning with my own novel based on the (unwritten) "Turn of the Screw," not only prospered, but utterly swamped another firm that was being launched at the same time. Faced with bankruptcy, its owner/founder accepted my less than munificent terms. You know who it was, the bastard.

Mark Ventnor is the oldest slush-pile reader in the publishing business.

As to Benjamin A. Corrick, PhD and now FRS . . . I financed his researches personally, when he was just beginning them. He was kind enough to give me a great deal of the credit last year when he received Honorable Mention in the Stockholm Nobel ceremonies—for having proven graphically and conclusively the utter impossibility of time travel. ■

JULY, 1974

THE ANALYTICAL LABORATORY

Place	Title	Author	Points
1.	Stargate (Pt. 2)	*Tak Hallus*	1.96
2.	Extreme Prejudice	*Jerry Pournelle*	2.68
3.	Dark Lantern	*P. J. Plauger*	3.36
4.	Forced Change	*Bob Buckley*	3.82
5.	The Engine at Heartspring's Center	*Roger Zelazny*	3.91
6.	Exclusive Either/Or	*Rowland E. Burns*	4.98

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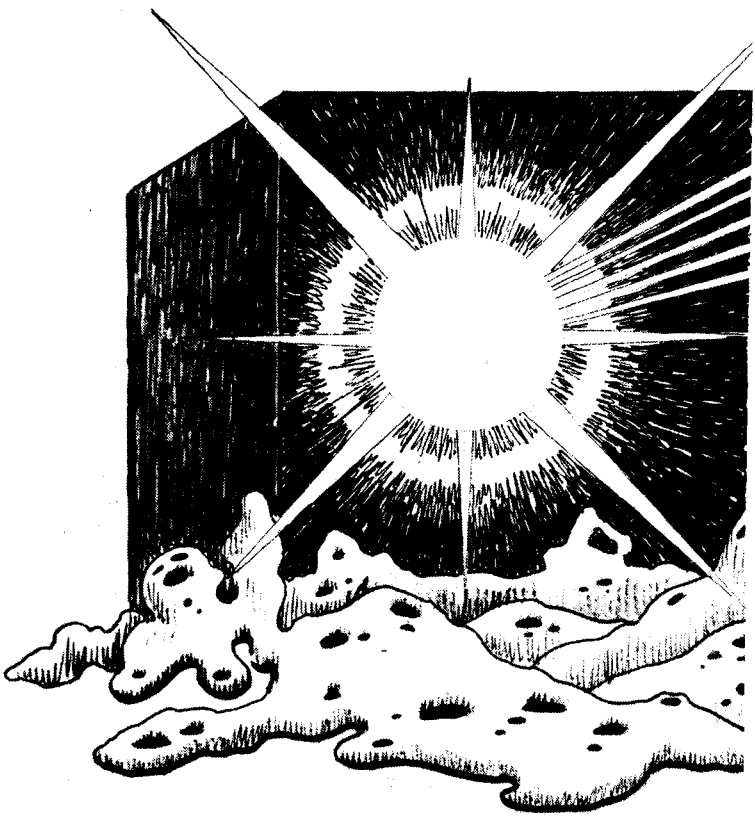
sleeping DOGS

He who sows the wind . . .

HARLAN ELLISON



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The only "positive" thing Lynn Ferraro could say about the destruction of the cities of Globar and Schall was that their burning made esthetically-pleasing smears of light against the night sky of Epsilon Indi IV.

"The stiffness of your back tells me you don't approve, Friend Ferraro." She didn't turn at his words, but she could feel her vertebrae cracking as she tensed. She kept her face turned to the screens, watching the twin cities shrink as the flames consumed them, a wild colossus whose pillared legs rose to meet a hundred meters above the debacle.

"A lot of good my disapproval does, Commander."

He made a sighing sound at her response. "Well, you have the satisfaction of knowing your report will more than likely terminate my career."

She turned on him, her facial muscles tight as sun-dried leather. "And a hell of a lot of good *that* does the people down there!"

She was an *Amicus Hostis,* a Friend of the Enemy, placed on board the Terran dreadnought *Descartes,* Solar Force registry number SFD/199-660, in this the forty-first year of the Earth-Kyba War, to prevent atrocities, to attempt *any kind* of rapprochement with the Kyben, should a situation present itself in which the Kyben would do other than kill or be killed. And when it had become clear that this lunatic, this butcher, this Commander Julian Drabix was determined to take the planet—at any cost—no matter how horrifyingly high—scorched earth if nothing short of that monstrousness would suffice—when it had become clear her command powers would be ignored by him, she had filed a light-wave report with Terran Central. But it would take time for the report to reach Central, time for it to be studied, time for a report-judgment and time for instructions to be light-fired back to the *Descartes.* And Drabix had not waited. Contravening the authority of the *Amicus,* he had unleashed the full firepower of the dreadnought.

Globar and Schall burned like Sodom and Gomorrah.

But unlike those God-condemned hellholes of an ancient religion, no one knew if the residents of Globar and Schall were good, or evil, or merely frightened natives of a world caught in the middle of an interstellar war that seemed destined *never* to end.

"All I know," Drabix had said, by way of justification, "is that planet's atmospheric conditions are perfect for the formation of the crystalline form of the power-mineral we need. If we don't get it, Kyba will. It's too rare, and it's too important to vacillate. I'm sorry about this, but it has to be done." So he had done it.

She argued that they didn't even know for certain if the mineral was

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there, in the enormous quantities Drabix believed were present. It was true the conditions were right for its formation and on similar worlds where the conditions were approximated they had found the precious crystals in small amounts . . . but how could even such a near-certainty justify destruction so total, so inhuman?

Drabix had chosen not to argue. He had made his choice, knowing it would end his career in the Service; but he was a patriot; and allegiance overrode all other considerations.

Ferraro despised him. It was the only word that fit. She despised everything about him, but this blind servitude to cause was the most loathsome aspect of his character.

And even that was futile, as Globar and Schall burned.

Who would speak the elegy for the thousands, perhaps millions, who now burned among the stones of the twin cities?

When the conflagration died down, and the rubble cooled, the *Descartes* sent down its reconnaissance ships; and after a time, Commander Drabix and Friend Ferraro went to the surface. To murmur among the ashes.

Command post had been set up on the island the natives called Stand of Light because of the manner in which the sunlight from Epsilon Indi was reflected back from the sleek boles of the gigantic trees that formed a central cluster forest in the middle of the twenty-five-kilometer spot of land. Drabix had ordered his recon teams to scour the planet and bring in a wide sample of prisoners. Now they stood in ragged ranks up and down the beach as far as Lynn Ferraro could see; perhaps thirty thousand men and women and children. Some were burned horribly.

She rode on the airlift platform with Drabix as he skimmed smoothly past them, just above their heads.

"I can't believe this," Drabix said.

What he found difficult to accept was the diversity of races represented in the population sample the recon ships had brought in. There were Bleshites and Mosynichii in worn leathers from the worlds of 61 Cygni, there were Camogasques in prayer togas from Epsilon Eridani, there were Kopektans and Livides from Altair II and X; Millmen from Tau Ceti, Oldonians from Lalande 21185, Runaways from Rigel; stalk-thin female warriors of the Seull Clan from Delta Cephei III, beaked Raskkans from the hollow asteroids of the Whip belt, squidlike Silvinoids from Grover; Petokii and Vulpeculans and Rohrs and Mawawanians and creatures even Drabix's familiarity with the Ephemeris could not identify.

Yet nowhere in the thousands of trembling and cursing prisoners—watching the airlift platform as it

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passed them—nowhere in that horde, could be seen even one single golden-skinned, tentacle-fingered Kyben. It was this, perhaps, that Drabix found the more impossible to accept. But it was so. Of the expeditionary force sent from far Kyba to hold this crossroads planet, not one survivor remained. They had all, to the last defender, suicided.

When the knowledge could no longer be denied, Lynn turned on Drabix and denounced him with words of his own choosing, words he had frequently used to vindicate his actions during the two years she had ridden as supercargo on the *Descartes*. " 'War is not merely a political act but also a political instrument, a continuation of political relations, a carrying out of the same by other means,' as Karl von Clausewitz has so perfectly said."

He snarled at her. "Shut your face, *Amicus!* I'm not in a mood for your stupidities!"

"And slaughter is not merely an act of war, is that right, Commander? Is it *also* a political instrument? Why not take me to see the stacked corpses? Perhaps I can fulfill *my* mission . . . perhaps I'll learn to communicate with the dead! You deranged fool! You should be commanding an abattoir, not a ship of the line!"

He doubled his right fist and punched her full in the face, within sight of the endless swarm of helpless prisoners and his own crew. She fell backward, off the airlift, tumbling down into the throng. Their bodies broke her fall, and within seconds members of Drabix's crew had rescued her; but he did not see it; the airlift had skimmed away and was quickly lost in the flash of golden brilliance reflecting off the holy shining trees of Stand of Light.

The adjutant found her sitting on a greenglass boulder jutting up from the edge of the beach. Waves came in lazily and foamed around the huge shape. There was hardly any sound. The forest was almost silent; if there were birds or insects, they had been stilled, as though waiting.

"Friend Ferraro?" he said, stepping into the water to gain her attention. He had called her twice, and she had seemed too sunk in thought to notice. Now she looked down at him and seemed to refocus with difficulty.

"Yes, I'm sorry, what is it, Mr. Lalwani?"

"The Commander would like to see you."

Her expression smoothed over like the surface of the pale blue ocean. "Where is he?"

"On the main continent, Miz. He's decided to take the forts."

She closed her eyes in pain. "Dear souls in Hell . . . will there never be an end? Hasn't he done enough to this wretched backwash?" Then she opened her eyes

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and looked at him closely. "What does he want with me? Has there been a reply from Central? Does he simply want an audience?"

"I don't know, Miz. He ordered me to come and find you. I have a recon ship waiting, whenever you're ready."

She nodded. "Thank you, Mr. Lalwani. I'll be along in a few moments."

He saluted and walked away up the beach and around the bend. She sat staring out across the ocean; as always: an observer.

They had charted the positions of the fifty "forts" during the first pass at the planet. Whether they were, in fact, forts was entirely supposition. At first they were thought to be natural rock formations—huge black cubes sunk into the earth of the tiny planet; featureless, ominous, silent—but their careful spacing around the equator made that unlikely. And the recon ships had brought back confirmation that they were created, not natural. *What* they were, remained a mystery.

Lynn Ferraro stood with Drabix and stared across the empty plain to the enormous black cube, fifty meters on a side. She could not remember ever having seen anything quite so terrifying. There was no reason to feel as she did, but she could not shake the oppression, the sense of impending doom. Even so, she had resolved to say nothing to Drabix. There was nothing that *could* be said. Whatever motivated him, whatever passions had come to possess him in his obsession about this planet, she knew no words she might speak could dissuade him.

"I wanted you here," he said, "because I'm still in charge of this operation, and whatever you may think of my actions I still follow orders. You're required to be in attendance, and I want *that* in the report."

"It's noted, Commander."

He glanced at her quickly. There had been neither tone nor inflection revealing her hatred, but it trembled in the air between them.

"I expected something more from you."

She continued staring at the black, featureless cube in the middle of the plain. "Such as?"

"A comment. An assessment of military priorities. A plea to spare these cultural treasures. Something . . . anything . . . to justify your position."

She looked at him and saw the depth of distaste he held for her. Was it her *Amicus* status, or herself he feared and despised. Had she been repelled less by his warrior manner, she might have pitied him—"There are men whom one hates until that moment when one sees, through a chink in their armor, the sight of something nailed down and in torment."

"The validity of my position will

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insure you never go to space again, Commander. If there were more I could do, something immediate and final, I would do it, by all the sweet dear souls in Hell. But I can't. You're in charge here, and the best I can do is record what I think insane behavior."

His anger flared again, and for a moment she thought he might hit her a second time, and she dropped back a step into a self-defense position. The first time he had taken her unaware; there would be no second time; she was capable of crippling him.

"Let me tell you a thing, *Amicus*, Friend of the Enemy! You follow that word all the way? The *Enemy?* You're a paid spy for the Enemy. An Enemy that's out to kill us, every one of us, that will stop nowhere short of total annihilation of the human race. The Kyben feed off a hatred of humankind unknown to any other race in the galaxy . . ."

"My threshold for jingoism is very low, Commander. If you have some information to convey, do so. Otherwise, I'll return to Stand of Light."

He breathed deeply, damping his rage, and when he could speak again he said, "Whether this planet has what I think it has, or not, quite clearly it's been a prize for a long time. A *long* time. A lot longer than *either* of us can imagine. Long before the war moved into this sector. It's been conquered and reconquered and conquered all over again. The planet's *lousy* with every marauding race I've ever even *heard* of. The place is like Terran China . . . let itself be overrun and probably didn't even put up a fight. Let the hordes in, submitted, and waited for them to be swallowed up. But more kept coming. There's something here they all wanted."

She had deduced as much herself; she needed no long-winded superficial lectures about the obvious. "And you think whatever it is they wanted is in the fifty forts. Have you spoken to any of the prisoners?"

"I've seen intelligence reports."

"But have you spoken to any of the prisoners *personally?*"

"Are you trying to make a case for incompetence, too?"

"All I asked is if you've spoken--"

"No, dammit, I haven't spoken to any of that scum!"

"Well, you should have!"

"To what end, Friend?" And he waved to his adjutant.

Drabix was in motion now. Lynn Ferraro could see there was nothing short of assassination that would stop him. And that was beyond her. "Because if you'd spoken to them, you'd have learned that whatever lives inside those forts has *permitted* the planet to be conquered. It doesn't care, as long as everyone minds their own business."

Drabix smiled, then snickered.

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"*Amicus*, go sit down somewhere, will you. The heat's getting to you."

"They say even the Kyben were tolerated, Commander. I'm warning you; let the forts alone."

"Fade off, Friend Ferraro. Command means decision, and my orders were to secure this planet. Secure doesn't mean fifty impregnable fortresses left untouched, and command doesn't mean letting bleeding hearts like you scare us into inaction with bogeymen."

The adjutant stood waiting. "Mr. Lalwani," Drabix said, "tell the ground batteries to commence on signal. Concentrate fire on the southern face of that cube."

"Yes, sir." He went away quickly.

"It's war, Commander. That's your only answer, that it's war?"

Drabix would not look at her now. "That's right. It's a war to the finish. They declared it, and it's been that way for forty years. I'm doing my job . . . and if that makes doing yours difficult, perhaps it'll show those pimply-assed bureaucrats at Central we need more ships and fewer Friends of the Enemy. *Something* has to break this stalemate with the Kyben, and even if I don't see the end of it I'll be satisfied knowing I was the one who broke it."

He gave the signal.

From concealed positions, lancet batteries opened up on the silent black cube on the plain.

Crackling beams of leashed energy erupted from the projectors, crisscrossed as they sped toward their target and impacted on the near face of the cube. Where they struck, novae of light appeared. Drabix lowered the visor on his battle helmet. "Protect your eyes, Friend," he warned.

Lynn dropped her visor, and heard herself shouting above the sudden crash of sound, "Let them alone!"

And in that instant she realized no one had asked the right question: where *were* the original natives of this world?

But it was too late to ask that question.

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The barrage went on for a very long time.

Drabix was studying the southern face of the cube through a cyclop. The reports he had received were even more disturbing than the mere presence of the forts: the lancets had caused no visible damage.

Whatever formed those cubes, it was beyond the destructive capabilities of the ground batteries. The barrage had drained their power sources, and still the fort stood unscathed.

"Let them alone? Don't disturb them? *Now* do you see the danger, the necessity?" Drabix was spiraling upward, his frustration and anxiety making his voice brittle and high. "Tell me how we secure a war zone with the Enemy in our midst, Friend?"

"They aren't the Enemy!" she insisted.

"Leave them alone, eh?"

"They *want* to be left alone."

Drabix sneered at her, took one last look through the cyclop and pulled the communicator loose from his wrist-cuff. He spoke directly to the *Descartes,* hanging in space above them. "Mr. Kokonen!"

The voice came back, clear and sharp. "Yes, sir?"

"On signal, pour everything you've got into the primary lancets. Hit it dead center. And keep it going till you open it up."

"On signal, sir."

"Drabix! Wait for Central to—"

"Minus three!"

"Let it alone! Let me try another—"

"Minus two!"

"Drabix . . . stop . . ."

"Minus one! Go to Hell, Friend!"

"You're out of your—"

"Commence firing!"

The lancet hurtled down out of the sky like a river of light. If struck the cube with a force that dwarfed the sum total of annihilation visited on the cube all that day. The sound rolled across the plain and the light was blinding. Explosions came so close together they merged into one endless report, the roof of the cube bathed in withering brilliance that rivaled the sun.

Lynn Ferraro heard herself screaming.

And suddenly, the lancet beam was cut off. Not from its source, but at its target. As though a giant, invisible hand had smothered the beam, it hurtled down out of the sky from the invisible dreadnought far above and ended in the sky above the cube. Then, as Drabix watched with eyes widening and the *Amicus* watched with open terror choking her, the beam was snuffed out all along its length. It disappeared back up its route of destructive force, into the sky, into the clouds, into the upper atmosphere and was gone.

A moment later, a new sun lit

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the sky as the dreadnought *Descartes* was strangled with its own weapon. It flared suddenly, blossomed . . . and was gone.

Then the cube began to rise from the earth. However much longer it was than what was revealed on the plain, Lynn Ferraro could not begin to estimate. It rose up and up, now no longer a squat cube, becoming a terrifying pillar of featureless black that dominated the sky. Somehow, she knew that at forty-nine other locations around the planet the remaining forts were also rising.

After endless centuries of solitude, whatever lived in those structures was awakening at last.

They had been content to let the races of the galaxy come and go and conquer and be assimilated, as long as they were not severely threatened. They might have allowed humankind to come here and exist, or they might have allowed the Kyben the same freedom. But not both.

Drabix was whimpering beside her.

And not even her pity for him could save them.

He looked at her, white-eyed. "You got your wish," she said. "The war is over."

The original natives of the planet were taking a hand, at last. The stalemate was broken. A third force had entered the war. And whether they would be inimical to Terrans or Kyben, no one could know. *Amicus* Ferraro grew cold as the cube rose up out of the plain, towering above everything.

It was clear: roused from sleep, the inhabitants of the fifty forts would never consider themselves Friends of the Enemy. ■

in times to come Alfred Bester's first science-fiction novel in more than fifteen years is the big news in our November issue. It's called "The Indian Giver," and it deals with the problems of immortality as only Bester can. Meaning that, among the characters you will meet are Grand Guignol, H. G. Wells, Edison, Houdini, Captain Nemo, Fee Five Grauman's Chinese, and all the Indians of the US, who have made a paradise out of the fetid remains of Lake Erie. That's for openers. The writer who has given us "The Demolished Man" and "The Stars My Destination" makes the long interval since his last novel worth the waiting!

November's issue will also feature a Guest Editorial by James Gunn, "Teaching Science Fiction Revisited." SF readers know Gunn as a top-flight writer. Not so well-known, perhaps, is that he is one of the best *teachers* of science fiction, at the University of Kansas. His Guest Editorial is an answer to June's Editorial on "Teaching Science Fiction."

Joe Haldeman is back with another segment of his Forever War series, a biting story called "This Best of All Possible Worlds." And Spider Robinson leaves Callahan's Place behind, to take us on the wackiest interstellar jaunt ever, in "When No Man Pursueth."

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inhuman error

Can a perfect imitation of a human be done by a perfect machine?

FRED SABERHAGEN

When the dreadnought *Hamilcar Barca* came out of the inhuman world of plus-space into the blue-white glare of Meitner's Sun the forty men and women of the dreadnought's crew were taut at their battle stations, not knowing whether or not the whole berserker fleet would be around them as they emerged. But then they were in normal space, seconds of time were ticking calmly by, and there were only the stars and galaxies to be seen, no implacable, inanimate killers coming to the attack. The tautness eased a little.

Captain Liao, his lean frame strapped firmly into the combat chair in the center of the dreadnought's bridge, had brought his ship back into normal space as close to Meitner's Sun as he dared—operating on interstellar, *c*-plus drive in a gravitational field this strong was dangerous, to put it mildly—but the orbit of the one planet of the system worth being concerned about was still tens of millions of kilometers closer to the central sun. It was known simply as Meitner's Planet, and was the one rock in the system habitable in terms of gravity and temperature.

Before his ship had been ten standard seconds in normal space, Liao had begun to focus a remote-controlled telescope to bring the planet into close view on a screen that hung before him on the bridge. Luck had brought him to the same side of the sun that the planet happened to be on; it showed under magnification on the screen as a thin illuminated crescent, covered with fluffy-looking

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perpetual clouds. Somewhere beneath those clouds a human colony of about ten thousand people dwelt, for the most part under the shelter of one huge ceramic dome. The colonists had begun work on the titanic project of converting the planet's ammonia atmosphere to a breathable one of nitrogen and oxygen. Meanwhile they held the planet as an outpost of some importance for the interstellar community of all Earth-descended men.

There were no flares of battle visible in space around the planet, but still Liao lost no time in transmitting a message on the standard radio and laser communications frequencies. "Meitner's Planet, calling Meitner's. This is the dreadnought *Hamilcar Barca.* Are you under attack? Do you need immediate assistance?"

There came no immediate answer, nor could one be expected for several minutes, the time required for signals traveling at the speed of light to reach the planet, and for an answer to be returned.

Into Liao's earphones now came the voice of his Detection and Ranging Officer. "Captain, we have three ships in view." On the bridge there now sprang to life a three-dimensional holographic presentation, showing Liao the situation as accurately as the dreadnought's far-ranging detection systems and elaborate combat computers could diagram it. He smoothed graying hair back from his high forehead with an habitual gesture, and tried to determine what was going on.

One ship, appearing as a small bright dot with attached numerical coordinates, was hanging relatively motionless in space, nearly on a line between *Hamilcar Barca* and Meitner's Planet. The symbol chosen for it indicated that this was probably a sizable craft, though not nearly as massive as the dreadnought. The other two ships visible in the presentation were much smaller, according to the mass-detector readings on them. They were also both considerably closer to the planet, and moving toward it at velocities that would let them land on it, if that was their intention, in less than an hour.

What these three ships were up to, and whether they were controlled by human beings or berserker machines, was not immediately apparent. After sizing up the situation for a few seconds, Liao ordered full speed toward the planet—full speed, of course, in the sense of remaining in normal space and thus traveling much slower than light—and to each of the three ships in view he ordered the same message beamed: "Identify yourself, or be destroyed."

The threat was no bluff. No one took chances where berserker machines were concerned. They were an armada of robot spaceships and supporting devices built by some unknown and long-vanished race to fight in some interstellar war that

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had reached its forgotten conclusion while men on Earth were wielding spears against the sabertooth tiger. Though the war for which the berserker machines had been made was long since over, still they fought on across the galaxy, replicating and repairing themselves endlessly, learning new strategies and tactics, refining their weapons to cope with their chief new enemy, Earth-descended man. The sole known basic in their fundamental programming was the destruction of all life, wherever and whenever they could find it.

Waiting for replies from the planet and the three ships, hoping fervently that the berserker fleet that was known to be on its way here had not already come and gone and left the helpless colony destroyed, Liao meanwhile studied his instruments critically. "Drive, this is the Captain. Can't you get a little more speed on?"

The answer came into his earphones: "No, sir, we're on the red line now. Another kilometer-per-second and we'll blow a power lamp, or worse. This is one heavy sun, and it's got some dirty space around it." The ship was running now on the same space-warping engines that carried it faster than light between the stars, but this deep within the huge gravitational well surrounding Meitner's Sun the power that could be applied to them was severely restricted. The more so because here space was dirty, as the Drive Officer had said, meaning the interplanetary matter to be encountered within this system was comparatively dense. It boiled down to the fact that Liao had no hope of overtaking the two small vessels that fled ahead of him toward the planet. They, as it were, skimmed over shoals of particles that the dreadnought must plow through, flirted with reefs of drive-wrecking gravitational potential that it must approach more cautiously, and rode more lightly the waves of the solar wind that streamed outward as always from a sun.

Now the minimum time in which the largest, nearest vessel might have replied to the dreadnought's challenge had come and gone. No reply had been received. Liao ordered the challenge repeated continuously.

The Communications Officer was speaking. "Answer from the planet, Captain. It's coming in code. I mean the simple standard dot-dash code, sir, like emergency signals. There's a lot of noise around too, maybe that's the only way they can get a signal through." Powerfully and crudely modulated dot-and-dash signals could carry intelligence through under conditions where more advanced forms of modulation were simply lost.

Communications was on the ball; already they had the decoded words flowing across a big screen on the bridge.

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DREADNOUGHT ARE WE EVER GLAD TO HEAR FROM YOU STOP ONE OF THE TWO LITTLE SHIPS CLOSING IN ON US MUST BE A BERSERKER STOP BETTER TRANSMIT TO US IN DOT-DASH CODE STOP LOTS OF NOISE BECAUSE SUN IS FLARING AND WE COULDNT READ YOUR SIGNAL VERY WELL

The letters abruptly stopped flowing across the screen. The voice of the Communications Officer said: "Big burst of noise, Captain, signals from the planet are going to be cut off entirely for a little while. This sun is a very active flare star . . . just a moment, sir. Now we're getting voice and video transmissions beamed to us from both small ships. But the signals from both ships are so garbled by noise we can't make anything out of them."

"Beam back to them in dot-dash, tell them they'll have to answer us that way. Repeat our warnings that they must identify themselves. And keep trying to find out what the ground wants to tell us." The Captain turned his head to look over at his Second Officer in the adjoining combat chair. "What'd you think of that, Miller? 'One of the two little ships must be a berserker'?"

Miller, by nature a somewhat morose man, only shook his massive head gloomily, knitted heavy brows, and saved his speech to make a factual report. "Sir, I've been working on identifying the two active ships. The one nearest the planet is so small it seems to be nothing more than a lifeboat. Extrapolating backward from its present course and position indicates it may well have come from the third ship, the one that's drifting, a couple of hours ago.

"The second little ship is a true interstellar vessel; could be a one-man courier ship or even somebody's private yacht. Or a berserker, of course." The enemy came in all shapes and sizes.

Still no answer had been returned from the large, drifting ship, though the dreadnought was continuing to beam threatening messages to her, now in dot-dash code. Detection reported now that she was spinning slowly around her longest axis, consistent with the theory that she was some kind of derelict. Liao checked again on the state of communications with the planet, but they were still cut off by noise.

"But here's something, Captain. Dot-and-dash is coming in from the supposed courier. Standard code as before, coming at moderate manual speed."

Immediately, more letters began to flow across the number-one screen on the bridge:

I AM METION CHONGJIN COMMANDING THE ONE MAN COURIER ETRURIA EIGHT DAYS OUT OF ESTEEL STOP CANNOT TURN ASIDE I AM CARRYING VITAL DEFENSE COMPONENT

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FOR COLONY STOP LIFEBOAT APPROX 12 MILLION KM TO MY PORT AND AHEAD IS SAID BY GROUND TO BE CLAIMING TO BE THE SHIP CARRYING THE DEFENSE COMPONENT THEREFORE IT MUST REALLY BE A BERSERKER STOP IT WILL PROBABLY REACH COLONY AND BOMB OR RAM IT BEFORE I GET THERE SO YOU MUST DESTROY IT REPEAT DESTROY THE BERSERKER QUOTE LIFEBOAT UNQUOTE MOST URGENT THAT YOU HIT IT SOON END MESSAGE

Miller made a faint whistling noise. "Sounds fairly convincing, Chief." During briefing back at base three standard days ago they had been informed of the fact that the colony on Meitner's Planet was awaiting shipment of a space inverter to complete and activate their defensive system of protective force-screens and beam-projecting weapons. Until the inverter could be brought from Esteel and installed the colony was virtually defenseless; the dreadnought had been dispatched to offer it some interim protection.

Liao was giving orders to Armament to lock the *c*-plus cannon of the main battery onto the lifeboat. "But fire only on my command." Turning back to the Second, he said: "Yes, fairly convincing. But the berserkers might have found out somehow that the space inverter was being rushed here. They might even have intercepted and taken over the courier carrying it. We can't see who we're talking to on that ship or hear his voice. It might have been a berserker machine that just tapped out that message to us."

The Communications Officer was on again. "Bridge, we have the first coded reply from the lifeboat coming in now. Here it comes on your screen."

WE ARE HENRI SAKAI AND WINIFRED ISPAHAN CARRYING THE DEFENSE MATERIEL NAMELY SPACE INVERTER THEY NEED ON THE PLANET STOP OUR SHIP THE WILHELMINA FROM ESTEEL WAS SHOT UP BY THE BERSERKER TWO DAYS AGO WHEN IT ALMOST CAUGHT US STOP THE BERSERKER OR ANOTHER ONE IS HERE NOW ABOUT 11 MILLION KM TO OUR STARBOARD AND A LITTLE BEHIND US YOU MUST KEEP IT FROM GETTING TO US OR TO THE PLANET WHERE MAYBE IT COULD RAM THE DOME END MESSAGE

"Communications," the Captain snapped, "how is this coming through? I mean, does this also seem like someone sending manual code?"

"No, sir, this is very rapid and regular. But if you mean, Captain, does that prove they're not human, it doesn't. In a lifeboat the transmitter often has a voice-to-code converter built in."

"And conversely a berserker could send slowly and somewhat irregularly, like a man, if it wanted

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to. Thank you." The Captain pondered in silence for a little while.

"Sir." Miller suggested, "maybe we'd better order both small ships to stop, until we can overtake and board them."

The Captain turned his head to look at him steadily, but remained silent.

Miller, slightly flustered, took thought and then corrected himself. "Now I see the problem more fully, sir. You can't do that. If one of them is really carrying the space inverter you don't dare delay him for a minute. A berserker fleet may materialize in-system here at any moment, and is virtually certain to arrive within the next six to eight hours. Our ship alone won't be able to do more than hit-and-run when that happens. Our fleet can't get here for another day. The colony will never survive the interval without their space inverter installed."

"Right. Even if I sent a fast launch ahead to board and inspect those ships, the delay would be too much to risk. And that's not all, Second. Tell me this—is this conceivably just some misunderstanding, and both of those ships are really manned by human beings?"

"Not a chance," the Second answered promptly. "They both claim to be carrying the space inverter, and that can't be true. Those things just aren't ordered or built in duplicate or triplicate, and they both claim to be bringing it from the planet Esteel . . . the next question is, can both of our little targets be berserkers? Trying to psych us into letting one of them get through? I'll keep trying to reach the ground, see if they can shed any more light on this." Miller swiveled away in his heavy chair.

"Good going."

In their earphones Communications said: "Here's more from the ship that calls itself *Etruria*, Bridge."

"Put it right on our screen."

REPEAT COLONY SAYS LIFEBOAT IS ALSO CLAIMING TO BE THE HUMAN ONE STOP THEY MUST BE A BERSERKER IMPERATIVE YOU STOP THEM WHAT DO YOU WANT ME TO DO TO PROVE IM HUMAN STOP REPEAT MY NAME IS METION CHONGJIN IM ALONE ON BOARD HERE WIFE AND KIDS AT HOME ON ESTEEL IF THAT MEANS ANYTHING TO YOU STOP REPEAT HOW CAN I PROVE TO YOU IM HUMAN END MESSAGE

"Easy," Captain Liao muttered to himself. "Father a human child. Compose a decent symphony. In the next forty minutes or so." That was approximately the time left before at least one of the ships would be able to reach the planet. Liao's mind was racing to formulate possible tests, but getting nowhere. Berserkers had awesome powers, not only as physical fighting machines, but as computers. They could not counterfeit either human

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appearance or human behavior successfully when under close observation; but Liao was not certain that a battery of psychologists with several days to work in would be able to say with certainty whether it was a living man or a lying berserker that answered their questions in dot-dash.

Time passed. Hurtling through silence and near-emptiness at many kilometers per second, the ships very slowly changed the positions of their symbols in the huge holographic presentation on the bridge.

"Now more from the *Wilhelmina's* lifeboat, Captain."

"Run that on the top of the screen, will you, and put any more that comes in from *Etruria* on the bottom."

HENRI AND WINIFRED HERE COLONY TELLS US OTHER SHIP IS CLAIMING TO BE FROM ESTEEL CARRYING DEFENSE COMPONENTS AND REQUESTING LANDING INSTRUCTIONS STOP IT MUST BE LYING IT MUST BE A BERSERKER MAYBE THE SAME ONE THAT ATTACKED OUR SHIP TWO DAYS AGO . . .

The message ran on and despite some irrelevancies and redundancies it outlined a coherent story. The *Wilhelmina* (if the story was to be believed) had been on an interstellar cruise, carrying a number of young people on some kind of student exchange voyage or post-graduate trip. Somewhere on the outskirts of the solar system that contained the heavily industrialized planet Esteel, a courier ship bound for Meitner's had approached and hailed the *Wilhelmina*, had in fact commandeered her to complete the courier's mission. Berserkers were in pursuit of the courier and had already damaged her extensively.

. . . AND WE WERE ON OUR WAY HERE WITH THE INVERTER WHEN ONE OF THE BERSERKERS ALMOST CAUGHT UP AGAIN TWO STANDARD DAYS AGO STOP WILHELMINA WAS BADLY SHOT UP THEN CREW ALL KILLED WE ARE ONLY TWO LEFT ALIVE TWO HISTORY STUDENTS WE HAD TERRIBLE PROBLEMS ASTROGATING HERE BUT MADE IT STOP LIVING IN LIFEBOAT AND WORKING RIDDLED SHIP IN SPACESUITS YOU CANT STOP US NOW AFTER ALL WE HAVE BEEN THROUGH STOP YOU MUST DESTROY THE BERSERKER SHIP WE WILL REACH PLANET BEFORE IT DOES I THINK BUT IT WILL BE ABLE TO HIT THE DOME BEFORE THE SPACE INVERTER CAN BE INSTALLED STOP WE ARE GOING TO KEEP SENDING UNTIL YOU ARE CONVINCED WE ARE HUMAN . . .

The message from the lifeboat went on, somewhat more repetitiously now. And at the same time on the bottom of the screen more words from *Etruria* flowed in:

I HAVE TRIED TO CATCH THE BER-

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SERKER LIFEBOAT AND SHOOT IT DOWN BUT I CANT ITS UP TO YOU TO STOP IT STOP WHAT DO YOU WANT ME TO DO TO PROVE IM HUMAN . . .

The Second Officer sighed lightly to himself, wondering if, after all, he really wanted his own command.

"Communications, beam this out," the Captain was ordering. "Tell them both to keep talking and give us their life histories. Birth, family, education, the works. Tell them both they'd better make it good if they want to live." On buttons on the arm of his chair he punched out an order for tea, and a moment later tea came to him there through a little door, hot in a capped cup with drinking tube attached. "I've got an idea. Second. You study the background this so-called Esteeler spaceman Metion Chongjin gives us. Think up someplace you might have known him. We'll introduce you to him as an old friend, see how he copes."

"Good idea, Chief."

"Communications here again, Bridge. We've finally gotten another clear answer back from the ground. It's coming through now, we'll put it in the middle of your number-one screen."

. . . IN ANSWER TO YOUR QUESTION NO THEY CANT BOTH BE BERSERKERS STOP AN HOUR AGO THERE WAS A BRIEF LETUP IN THE NOISE AND WE GOT ONE CLEAR LOOK AT A HUMAN MALE FACE ALIVE AND TALKING COGENTLY ANSWERING OUR QUESTIONS NO POSSIBILITY THAT WAS A BERSERKER BUT UNFORTUNATELY BOTH SUSPECT SHIPS WERE SENDING ON THE SAME FREQ AND WE DONT KNOW FROM WHICH ONE THAT VOICE AND PICTURE CAME BUT WE DO KNOW THAT ONE OF THEM IS HUMAN . . .

"Damnation, how they've botched things up. Why didn't they ask the two men to describe themselves, and see which description fit what they saw?"

"This is Communications again, Bridge. They may have tried asking that, sir, for all we know. We've lost contact with the ground again now, even on code. I guess the solar wind is heating up. Conditions in the ionosphere down there must be pretty fierce. Anyway, here's a little more from the *Etruria*":

WHAT DO YOU WANT ME TO DO TO PROVE IM HUMAN RECITE POETRY MARY HAD A LITTLE LAMB STOP SAY PRAYERS I NEVER MEMORIZED ANY OF THEM STOP OKAY I GIVE UP SHOOT US BOTH DOWN THEN END MESSAGE

The Second Officer thumped a fist on the arm of his massive chair. "A berserker would say that, knowing that its fleet was coming, and the colony would be defenseless if we stopped the space inverter from getting to it."

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Liao shrugged, and helped himself to a massive slug of tea. "But a human might say that too, being willing to die to give the colony a few more hours of life. A human might hope that given a few more hours some miracle might come along, like the human fleet getting here first after all. I'm afraid that statement didn't prove a thing."

"I . . . guess it didn't."

After another good slug of tea, Liao put in a call to Astrogation.

"Chief Astrogator here, sir."

"Barbara, have you been listening in on this? Good. Tell me, could those two supposed history students, probably knowing little science or technology, have brought that ship in here? Specifically, could they have astrogated for two days, maybe fifty or sixty light-years, without getting lost? I suppose the ship's autopilot was knocked out. They said they were living in the lifeboat and working the damaged ship in spacesuits."

"Captain, I've been pondering that claim too, and I just don't know. I can't say definitely that it would be impossible. If we knew just how badly that ship was damaged, what they had to work with, we could make a better guess."

The Captain looked back at his situation hologram. The apparently inert hulk that he had been told was the *Wilhelmina* was considerably closer now, lying as it did almost in *Hamilcar Barca*'s path toward Meitner's Planet. The dreadnought was going to pass fairly near the other ship within the next few minutes. "As to that, maybe we can find out something. Keep listening in, Barbara." Turning to the Second Officer, Liao ordered: "You're going to be taking over the Bridge shortly, Miller. I want us to match velocities with that supposed hulk ahead, and then I'm going over to her, in hopes of learning something."

"It might be booby-trapped, Captain."

"Then we'll have an answer, won't we? But I don't expect an answer will be found that easily. Also get me a reading on exactly how much time we have left to decide which ship we're going to fire on."

"I've already had the computers going on that, sir. As of now, thirty-two and a quarter minutes. Then the lifeboat will either be down in atmosphere or around on the other side of the planet, and out of effective range in either case. The courier will take a little longer to get out of effective range, but . . ." He gestured helplessly.

"The courier being slower won't help us. We have to decide in thirty-two minutes."

"Chief, I just had an idea. If the lifeboat was the berserker, since it's closer to the planet, wouldn't it have tried before we got here to head off the courier from the planet . . . oh. No good. No offensive weapons on the lifeboat."

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"Right, except perhaps it has one bloody big bomb, meant for the colony. While the courier ship doubtless has some light armament, enough to deal with the lifeboat if it got in range. Still nothing proven, either way."

In another minute the silent ship ahead was close enough for telescopes on the dreadnought to pick out her name by starlight. It was *Wilhelmina,* all right, emblazoned near one end of her cigar-like shape. The dreadnought matched velocities with her smoothly, and held position a couple of kilometers off. Just before getting into a launch with a squad of armed marines to go over and inspect her, Liao checked back with the Bridge to see if anything was new.

"Better hear this before you go," Miller told him. "I just introduced myself to Chongjin as an old buddy. This is his reply, quote: 'I honestly don't remember your name if I ever knew it, stop. If this was a test I guess I passed. Hurrah! Now get on with it and stop that berserker on the lifeboat . . .' and then the signal faded out again. Chief, our communication problems are getting steadily worse. If we're going to say anything more to either of those ships we'd better send it soon."

"How many minutes left, Second?"

"Just eighteen, sir."

Don't waste any of 'em. This ship is yours."

"I relieve you, sir."

No signs of either life or berserker activity were apparent on the *Wilhelmina* as the launch crossed the space separating her from the dreadnought and docked, with a gentle clang of magnetic grapples. Now Liao could see that the reported damage was certainly a fact. Holes several meters in diameter had been torn in *Wilhelmina*'s outer hull. Conditions inside could hardly be good.

Leaving one man with the launch, Liao led the rest of his small party in through one of the blasted holes, swimming weightlessly, propelling themselves by whatever they could grip. He had briefed the men to look for something, anything, that would prove or disprove the contention that humans had driven this ship for the last two days since she had been damaged.

Fifteen and a half minutes left.

The damage inside was quite as extensive as the condition of the hull had indicated. Their suit lights augmenting the sharp beams that Meitner's distant sun threw into the airless interior, the boarding party spread out, keeping in touch by means of their suit radios. This had undoubtedly been a passenger ship. Much of the interior was meant as living quarters, divided into single and double cabins, with accommodations for a couple of dozen people. What furnishings remained suggested luxury. So far, everything

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said by the lifeboat's occupant was being proved true, but Liao as yet had no clear evidence regarding that occupant's humanity, nor even a firm idea of what evidence he was looking for. He only hoped that it was here, and that he would recognize it at first sight.

The interior of the ship was totally airless now, having been effectively opened to the stars by the repeated use of some kind of penetration weapon. The ruin was much cleaner than any similarly damaged structure on a planet's surface could be, loose debris having been carried out of the ship with escaping air, or separated from her when her drive took her outside of normal space and time, between the stars.

"Look here, Captain." The Lieutenant in charge of the marine squad was beckoning to him. Liao followed, on a vertiginous twisting passage through the wreck.

Near the center of the slender ship the Lieutenant had found a place where a wound bigger than any of the others had pierced in, creating in effect an enormous skylight over what had been one of the largest compartments on board. Probably it had been a lounge or refectory for the passengers and crew. Since the ship was damaged this ruined room had evidently provided the most convenient observation platform for whoever or whatever had been in control: a small, wide-angle telescope, and a tubular electronic spectroscope, battery-powered and made for use in vacuum, had been roughly but effectively clamped to the jagged upper edge of what had been one of the lounge's interior walls and now formed a parapet against infinity.

The Lieutenant was swiveling the instruments on their mountings. "Captain, these look like emergency equipment from a lifeboat. Would a berserker machine have needed to use these, or would it have gear of its own?"

The Captain stood beside him. "When a berserker puts a prize crew on a ship, it uses man-sized, almost android machines for the job. It's just more convenient for the machines that way, I suppose, more efficient. So they could quite easily use instruments designed for humans." He swung his legs to put his magnetic boots against the lounge's soft floor, so that they held him lightly to the steel deck beneath, and stared at the instruments, trying to force more meaning from them.

Men kept on searching the ship, probing everywhere, coming and going to report results (or rather the lack of them) to Liao at his impromptu command post in what had been the lounge. Two marines had broken open a jammed door and found a small airless room containing a dead man who wore a spacesuit; cause of death was not immediately apparent, but the uniform collar visible through the hel-

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met's faceplate indicated that the man had been a member of *Wilhelmina*'s crew. And in an area of considerable damage near the lounge another, suitless, body was discovered wedged among twisted structural members. This corpse had probably been frozen near absolute zero for several days and exposed to vacuum for an equal length of time. Also its death had been violent. After all this it was hard to be sure, but Liao thought that the body had once been that of a young girl who had been wearing a fancy party dress when she met her end.

Liao could imagine a full scenario now, or rather two of them. Both began with the shipload of students, eighteen or twenty of them perhaps, enjoying their interstellar trip. Surely such a cruise had been a momentous event in their lives. Maybe they had been partying as they either entered or were about to leave the solar system containing the planet Esteel. And then, according to Scenario One, out of the deep night of space came the desperate plea for help from the damaged and harried courier, hotly pursued by berserkers that were not expected to be in this part of the galaxy at all.

The students would have had to remain on board the *Wilhelmina,* there being noplace for them to get off, when she was commandeered to carry the space inverter on to Meitner's Planet. Then urgent flight, and two days from Meitner's a berserker almost catching up, tracking and finding and shooting holes in *Wilhelmina,* somewhere in the great labyrinth of space and dust and stars and time, in which the little worlds of men were strange and isolated phenomena. And then the two heroic survivors, Henri and Winifred, finding a way to push on somehow.

Scenario Two diverged from that version early on, and was simpler and at first glance more credible. Instead of the *Wilhelmina* being hailed by a courier and pressed into military service, she was simply jumped by berserkers somewhere, her crew and passengers efficiently wiped out, her battered body driven on here ahead of the main berserker fleet in a ploy to forestall the installation of the space inverter and demolish the colony before any help could reach it. Scenario One was more heroic and romantic, Two more prosaic and businesslike. The trouble was that the real world was not committed to behaving in either style but went on its way indifferently.

A man was just now back from inspecting *Wilhelmina*'s control room. "Almost a total loss in there, sir, except for the Drive controls and their directional settings. Artificial gravity's gone, Astrogator's position is wiped out, and the autopilot too. Drive itself seems all right, as far as I can tell without trying it."

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"Don't bother. Thank you, mister."

Another man came to report, drifting upside-down before the captain in the lack of gravity. "Starboard forward lifeboat's been launched, Captain. Others are all still in place, no signs of having been lived in. Eight-passenger models."

"Thank you," Liao said courteously. These facts told him nothing new. Twelve minutes left now, before he must select a target and give the command to fire. In his magnetic boots he stood before the telescope and spectroscope as their user had done, and looked out at the stars.

The slow rotation of the *Wilhelmina* brought the dreadnought into view, and Liao flicked his suit radio to the intership channel. "Bridge, this is Captain. Someone tell me just how big that space inverter is. Could two untrained people manhandle it and its packing into one of those little eight-passenger lifeboats?"

"This is the Armaments Officer, sir," an answer came back promptly. "I used to work in ground installations, and I've handled those things. I could put my arms around the biggest space inverter ever made, and it wouldn't mass more than fifty kilograms. It's not the size makes 'em rare and hard to come by, it's the complexity. Makes a regular drive unit or artificial gravity generator look like nothing."

"All right. Thank you. Astrogation, are you there?"

"Listening in, sir."

"Good. Barbara, the regular astrogator's gear on this ship seems to have been wiped out. What we have then is two history students or whatever, with unknown astronomical competence, working their way here from someplace two days off, in a series of *c*-plus jumps. We've found their instruments, apparently all they used, simple telescope and spectroscope. You've been thinking it over, now how about it? Possible?"

There was a pause. Barbara would be tapping at her console with a pencil. "Possible, yes. I can't say more than that on what you've given me."

"I'm not convinced it's possible. With umpteen thousand stars to look at, their patterns changing every time you jump, how could you hope to find the one you wanted to work toward?" *Ten minutes.* Inspiration struck. "Listen! Why couldn't they have shoved off in the lifeboat, two days ago, and used its autopilot?"

Barbara's voice was careful as always. "To answer your last question first, Chief, lifeboats on civilian ships are usually not adjustable to give you a choice of goals; they just bring you out in the nearest place where you are likely to be found. No good for ei-

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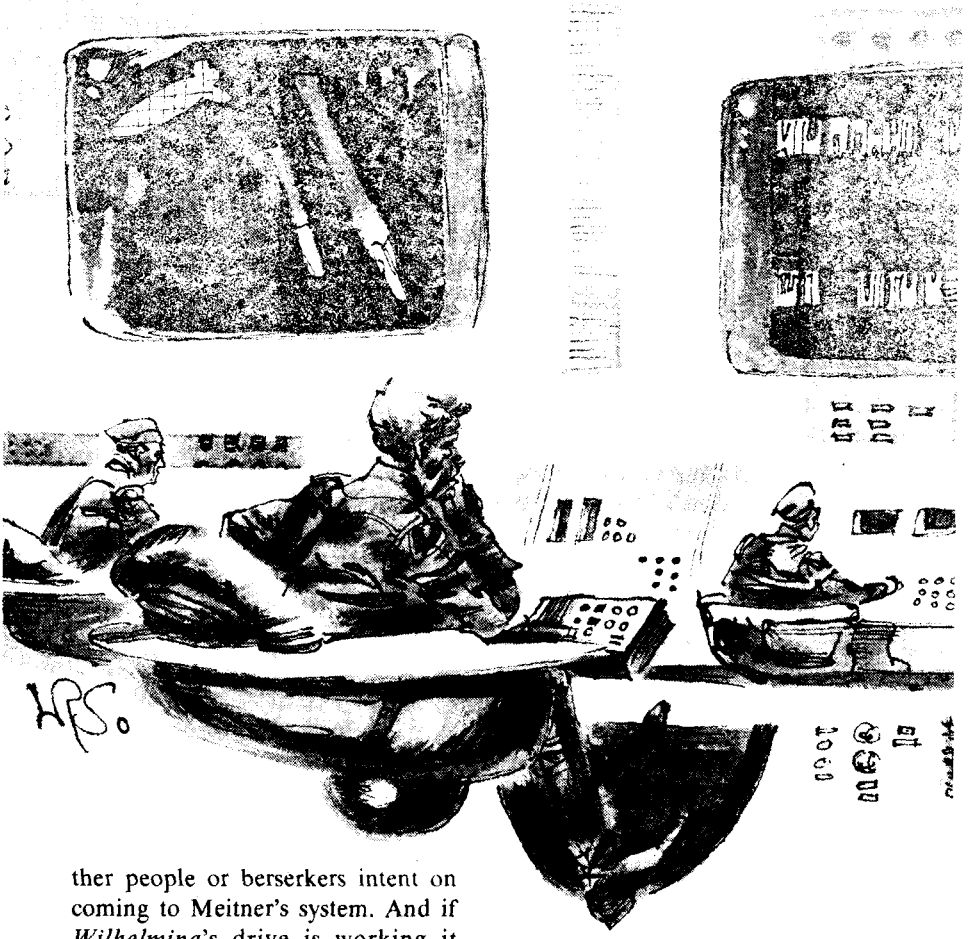

ther people or berserkers intent on coming to Meitner's system. And if *Wilhelmina*'s drive is working it could take them between the stars faster than a lifeboat could.

"To answer your first question, the lifeboats carry aids for the amateur astrogator, such as spectral records of thousands of key stars, kept on microfilm. Also often provided is an electronic scanning spectroscope of the type you seem to have found there. The star records are indexed by basic spectral type, you know, types O, B, A, F, G, K, and so on. Type O stars, for example, are quite rare in this neck of the woods so if you just scanned for them you would cut down tremendously on the number of stars to be looked at closely for identification. There are large drawbacks to such a system of astrogation, but on the other hand with a little luck one might go a long way using it. If the two students are real people, though, I'll bet at least one of them knows some astronomy."

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"Thank you," Liao said carefully, once again. He glanced around him. The marines were still busy, flashing their lights on everything and poking into every crevice. Eight minutes. He thought he could keep the time in his head now, not needing any artificial chronometer.

People had lived in this lounge, or rec room, or whatever it had been, and enjoyed themselves. The wall to which the astrogation instruments were now fastened had earlier been decorated, or burdened, with numerous graffiti of the kinds students seemed always to generate. Many of the messages, Liao saw now, were in English, an ancient and honorable language still fairly widely taught. From his own schooldays he remembered enough to be able to read it fairly well, helping himself out with an occasional guess.

CAPTAIN AHAB CHASES ALEWIVES, said one message proceeding boldly across the wall at an easy reading height. The first and third words of that were certainly English, but the meaning of the whole eluded him. Captain Liao chases shadows, he thought, and hunches. What else is left?

Here was another:

OSS AND HIS NOBLE CLASSMATES WISH THE WHOLE WORLD

And then nothingness, the remainder of the message having gone when Oss and his noble classmates went and the upper half of this wall went with them.

"Here, Captain! Look!" A marine was beckoning wildly.

The writing he was pointing to was low down on the wall and inconspicuous, made with a thinner writing instrument than most of the other graffiti had been. It said simply: *Henri & Winifred.*

Liao looked at it, first with a jumping hope in his heart and then with a sagging sensation that had rapidly become all too familiar. He rubbed at the writing with his suited thumb; nothing much came off. He said: "Can anyone tell me in seven minutes whether this was put here after the air went out of the ship? If so, it would seem to prove that Henri and Winifred were still around then. Otherwise it proves nothing." If the berserker had been here it could easily have seen those names and retained them in its effortless, lifeless memory, and used them when it had to construct a scenario.

"Where are Henri and Winifred now, that is the question," Liao said to the Lieutenant, who came drifting near, evidently wondering, as they all must be, what to do next. "Maybe that was Winifred back there in the party dress."

The marine answered: "Sir, that might have been Henri, for all that I could tell." He went on directing his men, and waiting for the Captain to tell him what else was to be done.

A little distance to one side of the names, an English message in

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the same script and apparently made with the same writing instrument went down the wall like this:

Oh	*Kiss*
Be	*Me*
A	*Right*
Fine	*Now*
Girl	*Sweetie*

Liao was willing to bet that particular message wasn't written by anyone wearing a space helmet. But no, he wouldn't make such a bet, not really. If he tried he could easily enough picture the two young people, rubbing faceplates and laughing, momentarily able to forget the dead wedged in the twisted girders a few meters away. Something about that message nagged at his memory, though. Could it be the first line of an English poem he had forgotten?

The slow turn of the torn ship was bringing the dreadnought into view again. "Bridge, this is Captain. Tell me anything that's new."

"Sir, here's a little more that came in clear from the lifeboat. I quote: 'This is Winifred talking now, stop. We're going on being human even if you don't believe us, stop.' Some more repetitious stuff, Captain, and then this: 'While Henri was navigating I would come out from the lifeboat with him and he started trying to teach me about the stars, stop. We wrote our names there on the wall under the telescope; if you care to look you'll find them; of course that doesn't prove anything, does it. If I had lenses for eyes I could have read those names there and remembered them . . .' It cuts off again there, Chief, buried in noise."

"Second, confirm my reading of how much time we have left to decide."

"Three minutes and forty seconds, sir. That's cutting it thin."

"Thanks." Liao fell silent, looking off across the universe. It offered him no help.

"Sir! Sir! I may have something here." It was the marine who had found the names, who was still closely examining the wall.

Looking at the wall where the man had aimed his helmet light, near the deck below the mounted instruments, Liao beheld a set of small grayish indented scratches, about half a meter apart.

"Sir, some machine coming here repeatedly to use the scopes might well have made these markings on the wall. Whereas a man or woman in spacesuits would not have left such marks, in my opinion, sir."

"I see." Looking at the marks, that might have been made by anything, maybe furniture banged into the wall during that final party, Liao felt an irrational anger at the marine. But of course the man was only trying to help. He had a duty to put forward any possibly useful idea that came into his head. "I'm not sure these were made by a berserker, spaceman, but it's some-

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thing to think about. How much time have we left, Second?"

"Just under three minutes, sir. Standing by ready to fire at target of your choice, sir. Pleading messages still coming in intermittently from both ships, nothing new in them."

"All right." The only reasonable hope of winning was to guess and take the fifty-fifty chance. If he let both ships go on, the bad one was certain to ram into the colony and destroy it before the other could deliver the key to the defenses and it could be installed. If he destroyed both ships, the odds were ten to one or worse that the berserker fleet would be here shortly and accomplish the same ruin upon a colony deprived of any chance of protecting itself.

Liao adjusted his throat muscles so that his voice when it came out would be firm and certain, and then he flipped a coin in his mind. Well, not really. There were the indented scratches on the bulkhead, perhaps not so meaningless after all, and there was the story of the two students' struggle to get here, perhaps a little too fantastic. "Hit the lifeboat," he said then, decisively. "Give it another two minutes, but if no new evidence turns up, let go at it with the main turret. Under no circumstances delay enough to let it reach the planet."

Understand, sir," said Miller's voice. "Fire at the lifeboat two minutes from your order."

He would repeat the order to fire, emphatically, when the time was up, so that there could be no possible confusion as to where responsibility lay. "Lieutenant, let's get the men back to the launch. Continue to keep your eyes open on the way, for anything . . ."

"Yes, sir."

The last one to leave the ruined lounge-observatory, Liao looked at the place once more before following the marines back through the ship. *Oh, be a fine girl, Winifred, when the slug from the* c-*plus cannon comes. But if I have guessed wrong and it is coming for you, at least you'll never see it. Just no more for you. No more Henri and no more lessons about the stars.*

The stars . . .

Oh, be a fine girl . . .

O, B, A, F, G, K, . . .

"Second officer!"

"Sir!"

"Cancel my previous order! Let the lifeboat land. Hit the *Etruria!* Unload on that bloody damned berserker with everything we've got, right now!"

"Yessir!"

Long before Liao got back to the launch the *c*-plus cannon volleyed. Their firing was invisible, and inaudible here in airlessness, but still he and the others felt the energies released pass twistily through all their bones. Now the huge leaden slugs would begin skipping in and out of normal space, homing on their tiny target, far out-racing light

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in their trajectories toward Meitner's Planet. The slugs would be traveling now like de Broglie wavicles, one aspect matter with its mass magnified awesomely by Einsteinian velocity, one aspect waves of not much more than mathematics. The molecules of lead churned internally with phase velocities greater than that of light.

Liao was back on the dreadnought's bridge before laggard light brought the faint flash of destruction back.

"Direct hit, Captain." There was no need to amplify on that.

"Good shots, Arms."

And then, only a little later, a message got through the planet's ionospheric noise to tell them that the two people with the space inverter were safely down.

Within a few hours the berserker fleet appeared in system, found an armed and ready colony, with *Hamilcar Barca* hanging by for heavy hit-and-run support, skirmished briefly and then decided to decline battle and departed. A few hours after that, the human fleet arrived and decided to pause for some refitting. And then Captain Liao had a chance to get down into the domed colony and talk to two people who wanted very much to meet him.

"So," he was explaining, soon after the first round of mutual congratulations had been completed, "when I at last recognized the mnemonic on the wall for what it was, I knew that not only had Henri and Winny been there but that he had in fact been teaching her something about astronomical spectroscopy at that very place beside the instruments—therefore after the ship was damaged."

Henri was shaking his youthful head, with the air of one still marveling at it all. "Yes, *now* I can remember putting the mnemonic thing down, showing her how to remember the order of spectral types. I guess we use mnemonics all the time without thinking about it much. *Every good boy does fine,* for the musical notes. *Bad boys race our young girls*—that one's in electronics."

The captain nodded. "*Thirty days hath September.* And *Barbara Celarent* that the logicians still use now and then. Berserkers, with their perfect memories, probably don't even know what mnemonics are, much less need them. Anyway, if the berserker had been on the *Wilhelmina,* it would've had no reason to leave false clues. No way it could have guessed that I was coming to look things over."

Winifred, slender and too fragile-looking for what she had been through, took him by the hand. "Captain, you've given us our lives, you know. What can we ever do for you?"

"Well. For a start . . ." He slipped into some English he had recently practiced: "You might be a fine girl, sweetie, and . . ." ■

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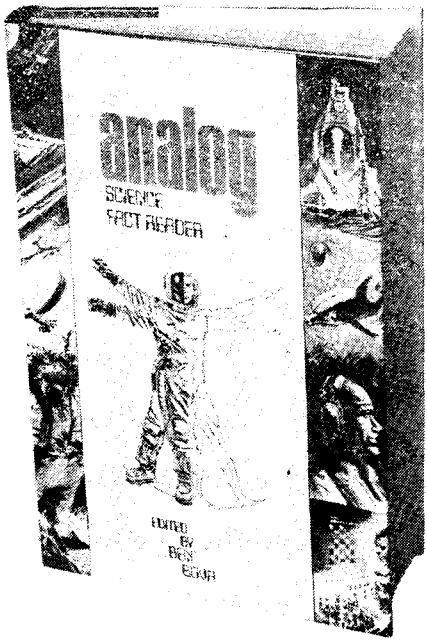

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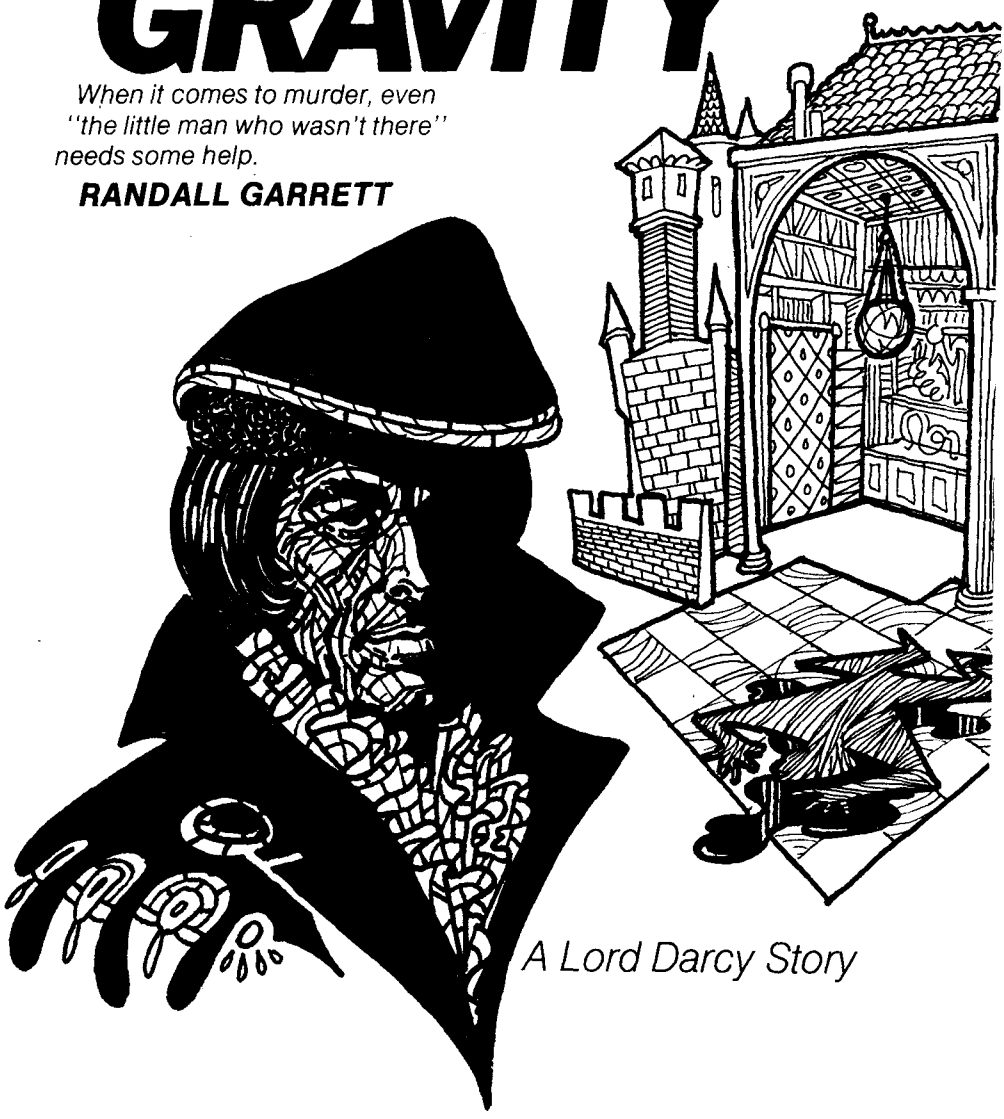
a matter of GRAVITY

When it comes to murder, even "the little man who wasn't there" needs some help.

RANDALL GARRETT



A Lord Darcy Story

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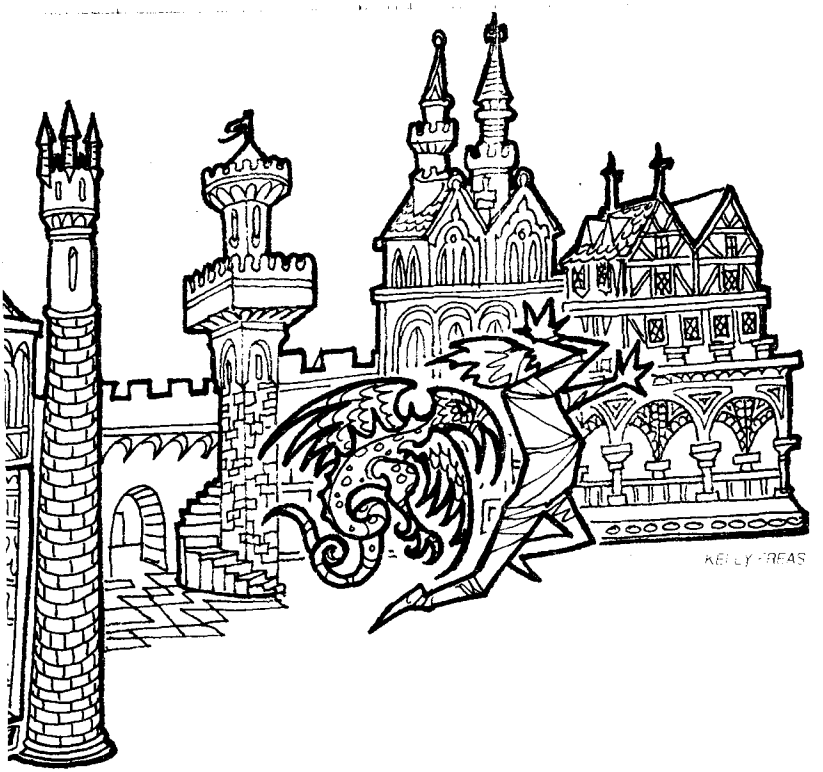

The death of My Lord Jillbert, Count de la Vexin, was nothing if not spectacular.

His Lordship lived and worked in Castle Gisors, which towers over the town of the same name, the capital of the County of the Vexin, in the eastern part of the Duchy of Normandy. The basic structure of the ancient fortress has been there since the Eleventh Century, although it has been added to and partly rebuilt since.

De la Vexin had succeeded to the County Seat in 1951, and had governed the Vexin wisely and well. He had a son, a daughter, and a hobby.

It was a combination of all these that killed him.

On the night of April 11, 1974, after attending the Mass of Holy Thursday, My Lord of the Vexin ascended the helical stairway that wound itself around the inside of the Red Tower, followed by two trusted sergeants of the Count's Own Guard—who were, in turn, followed by a four-man squad of ordinary guardsmen.

This was My Lord Count's regular procedure when he went to his *sanctum sanctorum* on the top floor of the Red Tower. When he went up there, eighty feet above the flagstoned courtyard, he wanted no

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interruptions while he attended to his avocation.

At one minute of ten, he entered his private rooms, leaving his guardsmen outside. No one but himself had been authorized to enter the uppermost room of the Red Tower in twenty years.

He dropped the heavy bar after locking the door, completely sealing the room.

Only two people saw him alive again, and then only for a matter of seconds.

Across the wide, flagstoned courtyard from the Red Tower stood St. Martin's Hall, a new addition built in the early Sixteenth Century, as its Ricardian style attested. Its great mullioned windows cast a warm, yellowed light on the courtyard outside; the hall was brightly illuminated from within, and would remain so all night, for there was a vigil at the Altar of Repose in the Lady Chapel.

Inside, a small fire crackled in the enormous fireplace—just enough blaze to take the slight chill from the air of a pleasant spring evening. On the mantelpiece, a large clock swung its pendulum as the minute hand moved inexorably upward to mark the hour of ten.

Lord Gisors, the only son of de la Vexin, poured himself another glass of Xerez. Of average height, his blocky, not unhandsome face was almost a younger replica of his father's, except that he had his mother's near-black hair and dark brown eyes instead of the brown-and-blue combination of his father. He turned from the sideboard, still holding the unstoppered decanter. "Care for another, my dear?"

The girl seated in the big easy chair in front of the fireplace smiled. "Please." With her right hand, she held out her glass, while her left brushed the long fair hair back from her brow. *She looks beautiful,* His Lordship thought.

Lord Gisors poured, then walked back to the sideboard with the decanter. As he put the glass stopple back in, he began: "You mustn't think badly of My Lord Father, Madelaine, even though he is a bit testy at times. He—"

"I know," she interrupted. "I know. He thinks only of the County. Never of individuals."

Frowning slightly, His Lordship came back with his glass and sat down in another easy chair near her. "But he does think of individuals, my love. He must think of every individual in the Vexin—as *I* must when I succeed to the County Seat. He has to take the long view and the broad view, naturally, but he *is* concerned about individuals."

She sipped at her glass of wine, then looked up at him with solemn gray eyes. "Does his concern for individuals include you? Or me? He knows we love each other, but he forbids our marriage, and insists that you marry Lady Evelynne de Saint-Brieuc—in spite of the fact

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that you do not love her nor she you. Is that concern for the individual or simply the desire to make an advantageous political marriage for you?"

Lord Gisors closed his eyes and held his tongue for a moment. The two of them had been over and over this ground many times; there was nothing new here. He had explained many times that, whereas My Lord the Count could forbid a marriage, he could not force one. Gisors had even reiterated time and again that he could appeal his case for marriage to His Royal Highness of Normandy, and, if that failed, to His Imperial Majesty—but that he would not do so out of deference to his father. His head seemed to ache at the monotony of "time and again."

He had not, of course, mentioned his own plans for marrying Madelaine without all the rigamarole. She might very likely rebel at the notion.

He opened his eyes again. "Be patient, my darling. I can assure you that he will—"

"—Come round to your way of thinking?" she cut in. "Never! The only time the Count de la Vexin will give his consent to our marriage will be when *you* are Count de la Vexin! Your father—"

"Quiet!" Lord Gisors said in an imperative undertone. *"My sister."*

At the far end of the hall, the door to the Lady Chapel had opened and closed. The woman walking toward them with a rather solemn smile on her face was carefully removing her chapel veil as she came down the wide carpeting to the fireplace. She nodded silently to each of them, then said: "Your watch, My Lord Brother. Ten to eleven, remember?"

Lord Gisors finished his wine and stood up with a smile. "Of course, My Lady Beverly. *'Can you not spend one hour with me?'* The Gospel according to Matthew." Tomorrow would be the Friday of the Crucifixion; this, the night before, would be symbolically spent in the Garden of Gethsemane with Our Lord. Gisors looked at the clock. It was the last second before ten.

" *'Father, my hour has come,'* St. John—" Gisors began.

The pendulum swung down.

The clock struck the first note.

"What the devil was that?" Lord Gisors yelled.

Outside, there had been a horrendous scream.

In the courtyard itself, a minute or so earlier, two militiamen of the Count's Own had been standing near the wall of St. Martin's Hall. One was the man at post, the other the Sergeant-of-the-Guard, who was making his evening rounds. They exchanged the usual military courtesies. The guardsman reported the state of his post as being quiet; the sergeant thanked him in the proper military manner. Then he said, with a grin: "It's better doing

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night duty in April than in March, eh, Jaime?"

Guardsman Jaime grinned back. "At least I'm not freezing my nose off, Sergeant Andray." His eyes shifted upward as he saw a gleam of light from the corner of his eye. "Here comes My Lord Count."

Sergeant Andray turned his head to follow Jaime's gaze. He knew that Jaime did not mean that My Lord the Count was actually approaching the post, merely that His Lordship was going into his private room at the top of the Red Tower. It was an occurrence both of them were used to. The Count was irregular in his visits to his private workshop, but his behavior each time was predictable. He made his presence known to those in the courtyard below by the light of his flickering torch showing through the lozenged window as he approached it from the door of his laboratory.

Then, as he stood on the desk in front of the window to light the gas jet just above the lintel, the flame of the torch rose, lifting out of sight above the window, leaving only a half-halo of light beneath.

Then the routine changed drastically.

Instead of the warm glow of the gaslight, there was an odd, moving flare of white light that seemed to chase itself around the room for a second or two.

Then, suddenly and violently, the leaded, lozenged window burst asunder, splattering glass through the air. Through that shattered window came the twisting figure of My Lord de la Vexin, a scream tearing from his throat as he somersaulted eighty feet to the stone pavement below, his small torch still in his hand, trailing a comet's tail of flame and sparks.

The Count and the courtyard met with fatal violence, and the sudden silence was punctuated only by the tinkling rain of shards of glass still falling from the ruined window above.

At 12:44 that evening, Jaque Toile, Chief Master-at-Arms for the city of Gisors, was waiting at the railroad station with two Sergeants-at-Arms as the train from Rouen pulled into the station.

Chief Jaque's hard eyes scanned the late-night passengers as they alighted from the first-class coaches. There were few of them, and the Chief quickly spotted the trio he was looking for. "Let's go," he said to the sergeants. "That's them."

The three Officers of the King's Peace moved in.

The three men who were their target stepped out of the coach and waited. The first was a tall, brown-haired, handsome man with lean features, wearing the evening dress of an aristocrat; the second was shorter and muscularly tubby, wearing the working dress of a sorcerer; the third was a rather el-

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derly, dried-up-looking fellow with gray hair, who wore pince-nez and the evening dress of a gentleman. On the shoulders of the latter two was embroidered the badge of the Duke of Normandy.

Chief Jaque walked up to the aristocratic-looking gentleman. "My Lord Darcy?"

Lord Darcy, Chief Investigator for His Royal Highness the Duke of Normandy, nodded. "I am. Chief Jaque Toile, I believe?"

"Yes, M'lord."

"My colleagues," said Lord Darcy by way of introduction, "Sean O Lochlainn, Master Sorcerer, Chief Forensic Sorcerer for His Royal Highness; Doctor James Pateley, Chief Forensic Chirurgeon."

The Chief Master-at-Arms acknowledged the introductions, then: "Sergeants Paul and Bertram, M'lord. We have an official carriage waiting, M'lord."

Four minutes later, the carriage was rolling toward Castle Gisors, its coil spring suspension and pneumatic tires making the ride comfortable in spite of the cobblestone streets. After what seemed a long silence, Lord Darcy's voice came smoothly.

"You seem pensive, my dear Chief."

"What? Oh. Yes. Sorry, M'lord. Just thinking."

"That was painfully apparent. May I inquire as to the subject of your thoughts?"

"Don't like cases like this," said Chief Jaque. "Not equipped for 'em. Ghosts, demons, black magic, that sort of thing. I'm not a scientist; I'm a peace officer."

Master Sean's blue eyes lit up with interest. "Ghosts? Demons? Black magic?"

"One moment," Lord Darcy said. "Let us be systematic. The only information we received at Rouen was that de la Vexin has fallen to his death. No details were given us via teleson. Just what did happen, Chief Jaque?"

The Chief Master-at-Arms explained what had happened as pieced together from the reports of the guardsmen on duty, just prior to My Lord de la Vexin's death.

"No question he was dead," the Chief said. "Skull smashed. Neck broken. Guard Sergeant Andray called for an extension fire ladder. Only way to get up into that room. Sent the guard from the courtyard up the stairs to notify the two men on duty at His Lordship's door."

"They hadn't known?" Lord Darcy asked.

Chief Jaque shook his head. "Door's too thick. Too thick to break down in a short time, even. Need an ax. That's why Andray went up the ladder. Climbed in the window and went over to unbar the door. By that time, the door guards were alerted. That's where the funny part comes in."

"Indeed?" murmured Lord Darcy. "Funny in what way?"

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"Nobody in the room. Doesn't make sense."

Master Sean thumbed his chin thoughtfully. "If that's the case, Chief Jaque, then he wasn't pushed, eh? Might it be that it was purely an accident? That when he got up on that desk to light the gaslamp, something slipped and he fell accidentally through the window and to his death?"

The Chief Master-at-Arms shook his head. "Not very likely, Master Sorcerer; body was eighteen feet from the wall. Glass spattered even farther." He shook his head again. "Didn't just fall. Not possible. He was pushed."

Dr. Pateley took his pince-nez from his thin nose and looked at them as he polished them with a fine linen handkerchief. "Or *jumped,* perhaps?" he asked in his diffident voice.

The Chief glanced at him sharply. "*Jumped?* You mean suicide?"

"Not necessarily," said the chirurgeon. He glanced up at Lord Darcy. "There are many reasons why a man might jump—eh, My Lord?"

Lord Darcy held back a smile. "Indeed, Doctor. Most astute of you." He looked at Chief Jaque. "Could he have jumped, Chief?"

"Could have. Doesn't make sense, though. Man doesn't commit suicide by jumping through a closed window. Doesn't make sense. A suicide who decides to jump opens the window first. Doesn't just take a flying leap through a pane of glass."

"That's not the point I had in mind," said Dr. Pateley, replacing his glasses carefully. "What if he were trying to get away from something?"

Chief Jaque's eyes widened. "I knew it! Demons!"

Twenty-five minutes later, Master Sean was saying: "Well, Me Lord, whatever it was that killed My Lord Vexin, it was certainly none of Chief Jaque's 'demons', nor any other form of projected psychic elemental."

Dr. Pateley frowned. "A what?"

"Elemental, my dear Doctor. A projected psychic manifestation symbolized by the four elementary states of matter: solid, liquid, gas, and plasma. Or earth, water, air, and fire, as they used to call them."

Along with Lord Darcy, Master Sean and the chirurgeon were standing in the room in the Red Tower from which the late Count had been ejected so forcibly. Master Sean had prowled round the room with his eyes half closed, his golden *crux ansata* in his right hand, probing everywhere. The others had stood by silently; it is unwise to disturb a magician at work. Then the round little Irish sorcerer had made his pronouncement.

Lord Darcy had not wasted his time in watching Master Sean; he

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had seen that process too many times to be interested in it. Instead, his keen gray eyes had been carefully surveying the room.

It was a fairly large room, covering the entire top floor of the Fourteenth Century tower except for the small landing at the head of the stairs. The landing was closed off by a heavy, padded walnut door.

Having noted that, Lord Darcy looked at the rest of the large room.

It was square, some twenty by twenty feet, the tower having been built in the old Norman style. There was only the one window in the room; the rest of the walls were covered with shelving and cabinets. Along the length of the west wall ran a shelf some thirty-two inches deep and three feet from the floor; it was obviously used as a worktable, for it was littered with various kinds of glassware, oddly-shaped pieces of wood and metal, a couple of balances, and other paraphernalia. The shelves above it contained rows of bottles and jars, each neatly labeled, containing liquids, powders, and crystals of various kinds.

On the south wall, flanking the shattered window, were two sections of shelving full of books. Half the east wall was filled with books, the other half with cabinets. There were more shelves and cabinets flanking the door of the north wall.

Because of the slight breeze that came in chillingly through the broken window, the gas flame in the sconce above it flickered and danced, casting weird shadows over the room and making glittering highlights on the glassware.

The Count's writing desk was set directly beneath the big window, its top flush with the sill. Lord Darcy walked over to the desk, leaned over it and looked down through the smashed window. There had been no unusual evidence there. My Lord the Count had, from all indications, died of a broken neck and a crushed skull, although the autopsy might tell more. A search of the body had revealed nothing of any consequence—but Lord Darcy now carried the key to the late Count's ultraprivate chamber in his pocket.

Below, Chief Jaque and his men were carefully lifting the body from a glittering field of broken glass and putting it into the special carriage of the local chirurgeon. The autopsy would be performed in the morning by Master Sean and Dr. Pateley.

Lord Darcy leaned back and looked up at the gas flame above the window. The Count de la Vexin had come in with his torch, as usual. Climbed up on his desk, as usual. Turned on the gas, as usual. Lit the gas with his torch, as usual. Then—

What?

"Spooky-looking place, eh, Me Lord?" Master Sean said.

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His Lordship turned round, putting his back to the window.

"Gloomy, at any rate, my dear Sean. Are there no other gas jets in this room? Ah, yes; I see them. Two on each of the other walls. Evidently the pipes were lengthened when the shelving was put in." He took out his pipe lighter. "Let's see if we can't shed a little more light on the subject." He went around the room carefully and lit the other six lamps. Even inside their glass chimneys, they tended to flicker; the room was better illuminated, but the shadows still danced.

"Ah! And an old-fashioned oil chandelier," Lord Darcy said, looking up. It was a brass globe some fifteen inches in diameter with a ring at the bottom and a wick with a glass chimney on top, suspended by a web of chains and a pulley system that allowed it to be pulled down for refueling and lighting. Even standing on tiptoe, Lord Darcy couldn't reach the ring.

He looked around quickly, then went to the door and opened it.

"*Corporal, is there a hook to* lower that oil lamp?"

"Blessed if I know, My Lord," said the Corporal of the Guard. "His Lordship never used it, the lamp, I mean. Hasn't been used as long as I know. Doubt if it has any oil in it, even, My Lord."

"I see. Thank you." He closed the door again. "Well, so much for additional illumination. Hm-m-m. Dr. Pateley, you measured the body; how tall was My Lord Count?"

"Five feet six, My Lord."

"That accounts for it, then."

"Accounts for what, My Lord?"

"There are seven gas jets in this room. Six of them are some seven and a half feet from the floor; the seventh, over the window, is nine feet from the floor. Why did he habitually light that one first? Because it is only six and a half feet from the desk top, and he could reach it."

"Then how did he reach the others if he needed more light?" Dr. Pateley asked, adjusting his pince-nez.

Master Sean grinned, but said nothing.

Lord Darcy sighed. "My dear chirurgeon, I honestly think you never look at anything but human bodies, ill, dying, or dead. What do you see over there?" He pointed to the northeast corner of the room.

Dr. Pateley turned. "Oh. A ladder." He looked rather embarrassed. "Certainly. Of course."

"Had *it not* been here," Lord Darcy said, "I would be quite astonished. How else would he get to his books and . . ."

His voice trailed off. His eyes were still on the ladder. "Hm-m-m. Interesting." He went over to the ladder, tested it, then climbed up it to the ceiling. He bent his head back to look at the ceiling carefully. "Aha. This was the old

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watchtower." He pushed up with one hand, then with both. Overhead, a two-and-a-half foot panel swung back on protesting hinges. Lord Darcy climbed on up and hoisted himself through the opening.

He looked around the roof of the tower, which was surrounded by crenellated walls. Then he came back down, closing the panel.

"Nothing up there, apparently, but I'll have to come back by daylight to check again, more thoroughly."

Then, without another word, he moved silently around the room, looking intently at everything but touching nothing. He looked up at the ceiling. "Heavy brass hooks," he murmured. "Why? Oh, of course. To suspend various pieces of his apparatus. Very good."

He had covered almost all the room before he finally came across something the really piqued his interest. He was standing near the door, his eyes searching the floor, when he said: "Aha! And what might this be?"

He knelt down, looked down at the object carefully, then picked it up between thumb and forefinger.

"It looks," said Master Sean, "like a four-inch piece of half-inch cotton rope, Me Lord. Very dirty, too."

His Lordship smiled dryly. "That appears to be exactly what it is, my good Sean. Interesting." He examined it closely.

"I would be obliged, My Lord," said Master Sean in a semi-formal manner, "if you would explain why it is so interesting."

Dr. Pateley merely blinked behind his pince-nez and said nothing.

"You have noticed, my dear Sean," Lord Darcy said, "how immaculately clean this laboratory is. It is well dusted, well cleaned. Everything seems to be in its place. There are no papers scattered about. There are no messy areas. The place is as neat and as well-kept as a cavalry officer's saber." He made a sweeping gesture to take in the whole room.

"It is, Me Lord, but—" Master Sean began.

"Then what, may I ask," His Lordship continued, "is a short piece of dirty rope doing on the floor?"

"I don't know, Me Lord." Master Sean was honestly puzzled. "What is its significance?"

Lord Darcy's smile broadened. "I haven't the foggiest notion in the world, Master Sean. But I have no doubt that there is *some* significance. What it is will await upon further information."

Another dozen minutes of inspection revealed nothing further to Lord Darcy's scrutiny. "Very well," he said, "we'll leave the rest of this until the morrow, when the light's better. Now let us go down and discuss this affair with those con-

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cerned. We'll get little sleep tonight, I fear."

Master Sean cleared his throat apologetically. "My Lord, the good chirurgeon and I, not being qualified for interrogating witnesses, had best occupy our time with the autopsy. Eh?"

"Eh? Oh, certainly, if you wish. Yes, of course." This, Lord Darcy thought, is what comes of assuming that others, even one's closest associates, have the same interests as oneself.

Within St. Martin's Hall, the clock on the mantelpiece solemnly struck the quarter-hour. It was fifteen minutes after two on the morning of Good Friday, 12 April 1974.

The Reverend Father Villiers stood near the fireplace, looking up at Lord Darcy. He was not tall—five-six or so—but his lean, compact body had an aura of physical strength about it. He was quick and accurate in his movements, but never seemed jerky or nervous. There was a calm awareness in him that showed spiritual strength as well. He was, Lord Darcy judged, in his forties, with only a faint touch of gray in his hair and mustache. The fine character lines in his handsome face showed strength, kindliness, and a sense of humor. But at the moment he was not smiling; there was a feeling of tragedy in his eyes.

"They are all in the Chapel, My Lord," he was saying in his brisk, pleasant, low tenor. "Lord Gisors, Lady Beverly, the Demoiselle Madelaine, and Sir Roderique MacKenzie."

"Who are the latter pair, Reverend Sir?" Lord Darcy asked.

"Sir Roderique is Captain of the Count's Own Guard. The Demoiselle Madelaine is his daughter."

"I shall not disturb them, Reverend Father," Lord Darcy said. "To seek solace before our Sacramental Lord on His Altar of Repose on this night is the sacrosanct right of every Christian, and should not be abrogated save in dire emergency."

"You don't consider murder an emergency?"

"Before its commission, yes. Not after. What makes you think it was murder, Reverend Father?"

The priest smiled a little. "It wasn't suicide. I spoke to him shortly before he went over to the Red Tower; as a Sensitive, I'd have picked up any suicidal emotions easily. And it could hardly have been an accident; if he'd merely lost his balance and fallen, he'd have landed at the foot of the wall, not eighteen or twenty feet away."

"Eighteen," murmured Lord Darcy.

"*Ergo*—murder," Father Villiers said.

"I agree, Reverend Father," Lord Darcy said. "The theory has been advanced that My Lord Count saw some sort of apparition which so frightened him that he leaped to

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his death through a closed window rather than face it. What is your opinion?"

"That would be Chief Jaque." The priest shook his head. "Hardly. His late Lordship would not even have sensed the presence of a true psychic apparition, and a phony—a piece of trickery—would have neither fooled nor frightened him."

"He couldn't have perceived a true psychic apparition?"

Father Villiers shook his head once more. "He was an example of that truly rare case, the psychically blind."

Ever since St. Hilary of Walsingham had formulated his analog equations on the Laws of Magic in the late Thirteenth Century, scientific sorcerers had realized that those laws could not be used by everyone. Some had the Talent and some did not. It was no more to be expected that everyone could be a sorcerer or healer or sensitive than to expect everyone to be a musician, a sculptor, or a chirurgeon.

But the inability to play a violin does not mean an inability to enjoy—or *not* enjoy—someone else's playing. One does not have to be a musician to perceive that music exists.

Unless one is tone-deaf.

To use another analogy: There are a few—very few—men and women who are *totally* color-blind. They are not just slightly crippled, like those who cannot distinguish between red and green; they see all things in shades of gray. To them, the world is colorless. It is difficult for such a person to understand why or how three identical objects, all the same shade of gray, can be identified by someone else as "red," "blue," and "green." To the totally color-blind, those words are without referents and are meaningless.

"His late Lordship," the priest said, "had an early desire to go into the priesthood, to forego his right to the County Seat in favor of his younger brother. He could not do so, of course. An un-Talented, psychically blind man would be as useless to the Church as a color-blind man would be to the Artist's Guild."

Naturally, Lord Darcy thought, that would not exclude the late de la Vexin from an executive position in His Imperial Majesty's Government. One doesn't need magical Talent to run a County effectively.

For over eight centuries, since the time of Henry II, the Anglo-French Empire had held its own and expanded. Henry's son, Richard, after narrowly escaping death from a crossbow bolt in 1199, had taken firm control of his kingdom and expanded it. At his death in 1219, his nephew Arthur had increased the kingdom's strength even more. The Great Reform, during the reign of Richard the Great, in the late Fifteenth Century, had put the Empire on a solid

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working basis, using psychic science to establish a society that had been both stable and progressive for nearly half a millennium.

"Where is My Lord the late Count's younger brother?" Lord Darcy asked.

"Captain Lord Louis is with the New England Fleet," Father Villiers said. "At present, I believe, stationed at Port Holy Cross on the coast of Mechicoe."

Well, that eliminates him *as a suspect,* Lord Darcy told himself. "Tell me, Reverend Father," he said aloud, "do you know anything about the laboratory His late Lordship maintained on the top floor of the Red Tower?"

"A laboratory? Is that what it is? No, I didn't know. He went up there regularly, but I have no idea what he did up there. I assumed it was some harmless hobby. Wasn't it?"

"It may have been," Lord Darcy admitted. "I have no reason to believe otherwise. Have you ever been in that room?"

"No; never. Nor, to my knowledge, has anyone else but the Count. Why?"

"Because," Lord Darcy said thoughtfully, "it is a very odd laboratory. And yet there is no doubt that it *is* some kind of laboratory for scientific research."

Father Villiers touched the cross at his breast. "Odd? How?" Then he dropped his hand and chuckled. "No. Not Black Magic, of course. He didn't believe in magic at all—black, white, purple, green, red, or rainbow. He was a Materialist."

"Oh?"

"An outgrowth of his psychic blindness, you see," the priest explained. "He wanted to be a priest. He was refused. Therefore, he rejected the basis for his refusal. He refused to believe that anything which he could not detect with his own senses existed. He set out to prove the basic tenet of Materialism: 'All phenomena in the Universe can be explained as a result of nonliving forces reacting with nonliving matter.'"

"Yes," said Lord Darcy. "A philosophy which I, as a living being, find difficult to understand, to say nothing of accepting. So that is the purpose of his laboratory—to bring the scientific method to bear on the Theory of Materialism."

"So it would appear, My Lord," said Father Villiers. "Of course, I have not seen His late Lordship's laboratory, but—"

"Who has?" Lord Darcy asked.

The priest shook his head. "No one that I know of. No one."

Lord Darcy glanced at his watch. "Is there anyone else in the Chapel besides the family, Reverend Sir?"

"Several. There is an outer door through which the occupants within the walls can come in directly from the courtyard. And there are four of the Sisters from the convent.

"Then I could slip in unnoticed for an hour of devotion before the

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Blessed Sacrament at the Altar of Repose?"

"Most assuredly, My Lord; there are people coming and going all the time. But I suggest you use the public entrance; if you use the family entrance, someone is sure to notice."

"Thank you, Reverend Father. At what hour will you celebrate the Mass of the Presanctified?"

"The service begins at eight o'clock."

"And how do I get to this outside door? Through that door and turn to my left, I believe?"

"Exactly, My Lord."

Three minutes later, Lord Darcy was kneeling in the back of the Chapel, facing the magnificently flowered Altar of Repose, his eyes on the veiled ciborium that stood at its center.

An hour and a quarter after that, he was sound asleep in the room which had been assigned him by the seneschal.

After the abrupt liturgical finale of the Mass of the Presanctified, at a little past ten on Good Friday morning, Lord Darcy and Master Sean stood waiting outside the family entrance of the Chapel. Dr. Pateley had excused himself immediately; he had volunteered to help one of the local men to prepare the late Count's body for the funeral. "Put things back the way we found 'em, My Lord," was the way he worded it.

Darcy and the stout little Irish sorcerer had placed themselves at the back of the congregation and had come out ahead of the family who were in their reserved pew at the front.

"I trust," murmured His Lordship very softly, "that Almighty God has reserved a special place of punishment for people who commit murder during Holy Week."

"Aye, Me Lord; I know what you mean," Master Sean whispered. "Meself, I enjoy the Three Hours of Sermon on Good Friday—especially by a really good preacher, which Father Villiers is reputed to be. But—'business before pleasure'." He paused, then went on in the same low tone. "D'you expect to clear up the case soon?"

"Before the day is out, I think."

Master Sean looked startled. "You know who did it, then?" He kept his voice down.

"*Who?* Of course. That should be plain. But I need more data on *how* and *why*."

Master Sean blinked. "But you haven't even questioned anyone yet, My Lord."

"No need to, for that. But my case is as yet incomplete."

Master Sean shook his head and chuckled. "Your touch of the Talent, Me Lord."

"You know, my dear Sean, you have almost convinced me that I *do* have a touch of the Talent. How did you put it?"

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"Like all great detectives, My Lord, you have the ability to leap from an unjustified assumption to a foregone conclusion without passing through the distance between. Then you back up and fill in." He paused again. "Well, then, who—"

"*Ssst!* Here they come."

Three people had come out of the Chapel: Lord Gisors, Lady Beverly, and the Demoiselle Madelaine MacKenzie.

Master Sean's lips barely moved, and his voice was barely audible as he said: "Wonder where the rest of the Clan MacKenzie went, Me Lord?"

"We'll ask." Both of them knew that Captain Sir Roderique MacKenzie and his son, Sergeant Andray, had been sitting in the family pew with the others.

The three came up the hallway toward the big fireplace in St. Martin's Hall, where Lord Darcy and Master Sean were waiting.

Lord Darcy stepped forward and bowed. "My Lord de la Vexin."

The young man looked startled. "No. My fa—" He stopped. It was the first time anyone had ever addressed him as "Lord de la Vexin." Of course it was only a courtesy title; he would not be the Count of the Vexin until his title had been validated by the King.

Lord Darcy, seeing the young man's confusion, went on: "I am Lord Darcy, My Lord. This is Master Sean. We appreciate the invitation to breakfast that was conveyed to us by your seneschal."

The new Lord de la Vexin had recovered his composure. "Ah, yes. I am pleased to meet you, My Lord. This is my sister, Lady Beverly, and the Demoiselle Madelaine. Come; breakfast should be ready for us immediately." He led the way.

The breakfast was delicious, not sumptuous: small, exquisitely poached *quinelles de poisson;* portions of eggs Boucher; hot cross buns; milk and *café.*

Captain Roderique and Sergeant Andray made their appearance a few minutes before the meal began, followed almost immediately by Father Villiers.

Conversation during breakfast consisted only of small talk, allowing Lord Darcy to observe the others of the party without being obtrusive about it.

De la Vexin still seemed dazed, as though his mind were somewhere else, only partly pulled back by conversation. The Demoiselle Madelaine, blond and beautiful, behaved with decorum, but there was a bright, anticipatory gleam in her eyes that Lord Darcy did not care for. Lady Beverly, some ten years older than her brother, her dark hair faintly tinged with gray at the temples, looked as though she had been born a widow—or a cloistered nun; she was quiet, soft-spoken, and self-effacing, but underneath Lord Darcy detected a

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firmness and intelligence kept in abeyance. Captain Sir Roderique MacKenzie was perhaps an inch taller than Lord Darcy—lean, with an upright, square-shouldered posture, a thick light-brown mustache and beard, and a taciturn manner typical of the Franco-Scot. His son was a great deal like him, except that he was smooth-shaven and his hair was lighter, though not as blond as that of his sister Madelaine. Both had an air about them that was not quite either that of the military or that of the Keepers of the King's Peace, but partook of both. They were Guardsmen and showed it.

Father Villiers seemed preoccupied, and Lord Darcy could understand why. The symbolic death of the Lord Jesus and the actual death of the Lord de la Vexin were too closely juxtaposed for the good Father's own spiritual comfort. Being a priest is not an easy life-game to play.

After breakfast, a fruit compote of Spanish oranges was served, followed by more *café*.

The late Count's son cleared his throat. "My lords, ladies, gentlemen," he began. He paused for a moment and swallowed. "Several of you have addressed me as 'de la Vexin'. I would prefer, until this matter is cleared up, to retain my title of Gisors. Uh—if you please." Another pause. He looked at Lord Darcy. "You came here to question us, My Lord?"

Lord Darcy looked utterly guileless. "Not really, Lord Gisors. However, if you should care to discuss the death of His Lordship, it might clear up some of the mysterious circumstances surrounding it. I know that none of you were in that room at the time of the—ah—incident. I am not looking for alibis. But have any of you any conjectures? How did the late Count de la Vexin die?"

Silence fell like a psychic fog, heavy and damp.

Each looked at the others to speak first, and nobody spoke.

"Well," Lord Darcy said after a time, "let's attack it from another direction. Sergeant Andray, of all the people here, you were apparently the only eyewitness. What was your impression of what happened?"

The sergeant blinked, sat up a little straighter, and cleared his throat nervously. "Well, Your Lordship, at a few minutes before ten o'clock, Guardsman Jaime and I were—"

"No, no, Sergeant," Lord Darcy interrupted gently. "Having read deposition you and Jaime gave to Chief Jaque, I am fully conversant with what you *saw*. I want to know your theories about the *cause* of what you saw."

After a pause, Sergeant Andray said, "It looked to me as if he'd *jumped* through the window, Your Lordship. But I have no idea why

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he would do such a thing.''.

"You saw nothing that might have made him jump?"

Sergeant Andray frowned. "The only thing was that ball of light. Paul and I both mentioned it in our reports."

"Yes. 'A ball of yellowish-white light that seemed to dance all over the room for a few seconds, then dropped to the floor and vanished,' you said. Is that right?"

"I should have said, 'dropped *toward* the floor,' Your Lordship. I couldn't have seen it actually hit the floor. Not from that angle."

"Very good, Sergeant! I wondered if you would correct that minor discrepancy, and you have done so to my satisfaction." Lord Darcy thought for a moment. "Now. You then went over to the body, examined it, and determined to your satisfaction that His Lordship was dead. Did you touch him?"

"Only his wrist, to try to find a pulse. There was none, and the angle of his head . . ." He stopped.

"I quite understand. Meanwhile, you had sent Guardsman Jaime for the fire wagon. When it came, you used the extension ladder to go up and unlock the door, to let the other guardsmen in. Was the gaslight still on?"

"No. It had been blown out. I shut off the gas, and then went over and opened the door. There was enough light from the yard-lamps for me to see by."

"And you found nothing odd or out of the way?"

"Nothing and nobody, Your Lordship," the sergeant said firmly. "Nor did any of the other guardsmen."

"That's straightforward enough. You searched the room then?"

"Not really searched it. We looked around to see if there was anyone there, using hand torches. But there's no place to hide in that room. We had called the armsmen; when they came, they looked more carefully. Nothing."

"Very well. Now, when I arrived, that gaslight over the window was lit. Who lit it?"

"Chief Master-at-Arms Jaque Toile, Your Lordship."

"I see. Thank you, Sergeant." He looked at the others, one at a time. Their silence seemed interminable. "Lady Beverly, have you anything to add to this discussion?"

Lady Beverly looked at Father Villiers with her calm eyes.

The priest was looking at her. "My advice is to speak, my child. We must get to the bottom of this."

I see, Lord Darcy thought. *There is something here that has been discussed in the confessional. The Reverend Father* cannot *speak—but he can advise* her *to.*

Lady Beverly looked back to Lord Darcy. "You want a theory, My Lord? Very well." There was a terrible sadness in her voice. "His late Lordship, my father, was pun-

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ished by God for his unbelief. Father Villiers has told me that this could not be so, but"—she closed her eyes—"I greatly fear that it is."

"How so, My Lady?" Darcy asked gently.

"He was a Materialist. He was psychically blind. He denied that others had the God-given gift of the Sight and the Talent. He said it was all pretense, all hogwash. He was closed off to all emotion."

She was no longer looking *at* Lord Darcy; she was looking through and beyond him, as though her eyes were focused somewhere on a far horizon.

"He was not an evil man," she continued without shifting her gaze, "but he was sinful." Suddenly her eyes flickered, and she was looking directly into Lord Darcy's gray eyes. "Do you know that he forbade a wedding between my brother and the Demoiselle Madelaine because he could not see the love between them? He wanted Gisors to marry Evelynne de Saint-Brieuc."

Darcy's eyes moved rapidly to Lord Gisors and Madelaine MacKenzie. "No. I did not know that. How many did?"

It was Captain Sir Roderique who spoke. "We all did, My Lord. He made a point of it. The Count forbade it, and I forbade it. But legally I had no right to forbid my daughter."

"But why did he—"

Lord Darcy's question was cut off abruptly by Lady Beverly.

"Politics, My Lord. And because he could not see true love. So God punished him for his obstinacy. May I be excused, My Lord? I would hear the Three Hours."

Quickly, Father Villiers said: "Would you excuse us both, My Lord?"

"Certainly, Reverend Sir, Lady Beverly," Lord Darcy said, rising. His eyes watched them in silence as they left the room.

Half past noon.

Lord Darcy and Master Sean stood in the courtyard below the Red Tower gazing at a small sea of broken glass surrounded by a ring of armsmen and guardsmen.

"Well, my dear Sean, what did you think of our little breakfast conversation?"

"Fascinating, Me Lord," said the sorcerer. "I think I'm beginning to see where you're going. Lady Beverly's mind is not exactly straight, is it?"

"Let's put it that she seems to have some weird ideas about God," Lord Darcy said. "Are you ready for this experiment, Master Sean?"

"I am, Me Lord."

"Don't you need an anchor man for this sort of thing?"

Master Sean nodded. "Of course, Me Lord. Chief Jaque is bringing Journeyman Emile, forensic sorcerer for the County. I met him last night; he's a good man; he'll be a Master one day.

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"Actually, Me Lord, the spells are quite simple. According to the Law of Contiguity, any piece of a structure remains a part of the structure. We can return it to the last state in which it was still a part of the contiguous whole—completely, if necessary, but you only want to return it to the point *after* the fracture but *before* the dispersal. Doing it isn't difficult; it's holding it in place afterwards. That's why I need an anchor man."

"I'll take my measurements and make my observations as quickly as possible," Lord Darcy promised. "Ah! There they are!"

Master Sean followed His Lordship's gaze toward the main gate of the courtyard. Then, very solemnly, he said: "Ah, yes. One man is wearing the black-and-silver uniform of a chief master-at-arms; the other is wearing the working garb of a journeyman sorcerer. By which I deduce that they are *not* a squad of Imperial Marines."

"Astute of you, my dear Sean; keep working at it. You will become an expert detective on the same day that I become a Master Sorcerer. Chief Jaque and I will go up to the tower room while you and Journeyman Emile work here. Carry on."

Lord Darcy toiled up eight flights of stairs, past several offices, vaguely wishing he were in the castle at Evreux, where the Countess D'Evreux's late brother had installed a steam-powered elevator. *No fool he,* Lord Darcy thought.

At the top landing, an armsman and a guardsman came immediately to attention as His Lordship appeared. He nodded at them. "Good afternoon." With thumb and forefinger he probed his left-hand waistcoat pocket. Then he probed the other. "Is that room locked?" he asked.

The armsman tested it. "Yes, Your Lordship."

"I seem to have mislaid the key. Is there another?"

"There is a duplicate. Your Lordship," said the guardsman, "but it's locked up in Captain Sir Roderique's office. I'll fetch it for you, if you like; it's only two floors down."

"No. No need." Lord Darcy produced the key from his right-hand waistcoat pocket. "I've found it. Thank you, anyway, Guardsman. Chief Jaque will be up in a few minutes."

He unlocked the door, opened it, went in, and closed the door behind him.

Some three minutes later, when Chief Jaque opened the door, he said: "Looking for something, My Lord?"

Lord Darcy was on his knees, searching a cupboard, moving things aside, taking things out. "Yes, my dear Chief; I am looking for the wherewithal to hang a murderer. At first, I thought it more likely it would be in one of the

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high cupboards, but they contain nothing but glassware. So I decided it must be—ah!" He pulled his head back out of the cupboard and straightened up, still on his knees. From his fingers dangled a six-foot length of ordinary-looking cotton rope.

"Bit scanty to hang a man," Chief Jaque said dubiously.

"For this murderer, it will be quite adequate," said Lord Darcy, standing up. He looked closely at the rope. "If only it—"

He was interrupted by a halloo from below. He went to the shattered remains of the window and looked down. "Yes, Master Sean?" he called.

"We're ready to begin, My Lord," the round little Irish sorcerer shouted up. "Please stand back."

In the courtyard, armsmen and guardsmen stood in a large circle, facing outward from the center, surrounding the fragments from the broken window. Journeyman Emile, a short, lean man with a Parisian accent, had carefully chalked a pale blue line around the area, drawing it three inches behind the bootheels of the surrounding guard.

"It is that I am ready, Master," he said in his atrocious patois.

"Excellent," said Master Sean. "Get the field set up and hold it. I will give you all the strength I can."

"But yes, Master." He opened his symbol-decorated carpetbag—similar to in general, but differing from in detail, Master Sean's own—and took out two mirror-polished silvery wands which were so deeply incised with symbol engraving that they glittered in the early afternoon sunlight. "For the Cattell Effect, it is that it is necessary for the silver, no?"

"It is," agreed Master Sean. "You will be handling the static spells while I take care of the kinetic. Are you ready?"

"I am prepared," Journeyman Emile said. "Proceed." He took his stance just inside the blue-chalked circle, facing the Red Tower and held up his wands in a ninety-degree *V*.

Master Sean took an insufflator from his own carpetbag and filled it with a previously-charged powder. Then, moving carefully around the circle, he puffed out clouds of the powder, which settled gently to the courtyard floor, touching each fragment of glass with at least one grain of the powder.

When he had completed the circle, Master Sean stood in front of Journeyman Emile. He put the insufflator back in his carpetbag and took out a short, eighteen-inch wand of pale yellow crystal, with which he inscribed a symbol in the air.

The Cattell Effect began to manifest itself.

Slowly at first, then more rapidly, the fragments from the shattered window began to move.

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Like a reverse cascade in slow motion, they lifted and gathered themselves together, a myriad of sparkling shards moving upward, fountaining glitteringly toward the empty window casement eighty feet above. There was a tinkling like fairy bells as occasional fragments struck each other on the way up as they had struck on the way down.

Only the superb discipline of the armsmen and guardsmen kept them from turning to see.

Up, up, went the bits and pieces, like sharp-edged raindrops falling toward the sky.

At the empty opening, they coalesced and came together to form a window—that was not quite a window. It bulged.

Inside the late Count's upper room, Lord Darcy watched the flying fragments return whence they had come. When the stasis was achieved, Lord Darcy glanced at the Chief Master-at-Arms.

"Come, my dear Jaque; we must not tax our sorcerers more than necessary." He walked over to the window, followed by the Chief Armsman.

The lozenged window was neither a shattered wreckage nor a complete whole. It bulged outward curiously, each piece almost touching its neighbor, but not fitted closely to it. The leading between the lozenges was stretched and twisted outward, as if the whole window had been punched from within by a gigantic fist and had stopped stretching at the last moment.

"Not quite sure I understand this." said Chief Jaque.

"This is the way the window was a fraction of a second after His Lordship, the late Count, struck it. At that time, it was pushed outward and broken, but the fragments had yet to scatter. I direct your attention to the central portion of the window."

The Chief Master-at-Arms took in the scene with keen eyes. "See what you mean. Like a mold, a casting. There's the chin—the chest—the belly—the knees."

"Exactly. Now try to get yourself into a position such that you would make an impression like that," Lord Darcy said.

The Chief grinned. "Don't need to. Obvious. Calves bent back at the knees. Head bent back so the chin hit first. Chest and belly hit first." He narrowed his eyes. "Didn't jump out; didn't fall out. Pushed from behind—violently."

"Precisely so. Excellent, Chief Jaque. Now let us make our measurements as rapidly and as accurately as possible," Lord Darcy said, "being careful not to touch that inherently unstable structure. If we do, we're likely to get badly-cut hands when the whole thing collapses."

Below, in the courtyard, an unmoving tableau presented itself. Armsmen and guardsmen stood at

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parade rest, while the two sorcerers stood like unmoving statues, their eyes and minds on the window above, their wands held precisely and confidently.

Minute after minute went by, and the strain was beginning to tell. Then Lord Darcy's voice came: "Anytime you're ready, Master Sean!"

Without moving, Master Sean said sharply, "Sergeant! Get your men well back! Move 'em!"

The Sergeant-at-Arms called out orders, and both armsmen and guardsmen rapidly moved back toward the main gate. Then they turned to watch.

The magicians released control. The powerful forces which had held up the glass shards no longer obtained, and gravity took over. There was an avalanche, a waterfall of sparkling shards. They slid and tumbled down the stone wall with a great and joyous noise and subsided into a heap at the foot of the Red Tower.

The display had not been as spectacular as the reconstruction of the window had been, but it was quite satisfactory to the armsmen and guardsmen.

A few minutes later, Master Sean toiled his way up the stairs and entered the late Count's laboratory.

"Ah! Master Sean," said Lord Darcy, "Where is Journeyman Emile?"

The Irish sorcerer's smile was a little wan. "He's headed home, My Lord. That's exhaustin' work, and he hasn't trained for it as I have."

"I trust you conveyed to him my compliments. That was a marvelous piece of work the two of you did."

"Thank you, My Lord. I gave Journeyman Emile my personal compliments and assured him of yours. Did you get what you wanted, My Lord?"

"I did, indeed. There is but one more thing. A simple test, but I'm sure it will be most enlightening. First, I will call your attention to those two five-gallon carboys which Chief Jaque and I have just discovered in one of the lower cupboards."

The carboys, which had been lifted up to the worktable, stood side by side, labels showing. One of them, with scarcely half an inch of pale yellowish liquid in it, was labeled *Concentrated Aqueous Spirit of Niter.* The other, half full of a clear, oily-looking liquid, was *Concentrated Oil of Vitriol.*

"I suppose you knew you'd find 'em, Me Lord?" Master Sean said.

"I didn't *know*; I merely suspected. But their presence certainly strengthens my case. Do they suggest anything to you?"

Master Sean shrugged. "I know what they are, My Lord, but I'm not a specialist in the Khemic Arts."

"Nor am I." Lord Darcy took out his pipe and thumbed tobacco into it. "But an Officer of the

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King's Justice should be widely read enough to be a jack-of-all-trades, at least in theory. Do you know what happens when a mixture of those acids is added to common cotton?"

"No—wait." Master Sean frowned, then shook his head. "I've read it somewhere, but—the details won't come."

"You get nitrated cotton," Lord Darcy said.

Chief Jaque coughed delicately. "Well, what does *that* do, Your Lordship?"

"I think I can show you," His Lordship said with a rather mysterious smile. From his wallet, he took the four-inch piece of blackened rope he had found near the door the evening before. Then he picked up the six-foot piece of clean rope he had found half an hour before. Using his sharp pocketknife, he cut a small piece from the end of each and put them on the lab table about eighteen inches from each other. "Chief Jaque, take these long pieces and put them on the desk, well away from here. I shouldn't want to lose *all* my evidence. Thank you. Now watch."

He lit each bit with his pipe lighter. They both flared in a sudden hissing burst of yellow-white flame and were gone, leaving no trace. Lord Darcy calmly lit his pipe.

Master Sean's eyes lit up. "Aaa-*hah*!"

Chief Jaque said: "The demon!"

"Precisely, my dear Chief. Now we must go down and talk to the rest of the *dramatis personae.*"

As they went back down the stairs, Master Sean said: "But why was the short piece covered with dirt, My Lord?"

"Not dirt, my dear Sean; lampblack."

"Lampblack? But why?"

"To render it invisible, of course."

"You are not preaching the Three Hours, Reverend Father?" Lord Darcy asked with a raised eyebrow.

"No, My Lord," Father Villiers replied. "I am just a little too upset. Besides, I thought my presence here might be required. Father Dubois very kindly agreed to come over from the monastery and take my place."

Clouds had come, shortly after noon, to obliterate the bright morning sun, and a damp chill had enveloped the castle. The chill was being offset by the fire in the great fireplace in St. Martin's Hall, but to the ten people seated on sofas and chairs around the fireplace, there seemed to be a different sort of chill in the huge room.

The three MacKenzies, father, son, and daughter, sat together on one sofa, saying nothing, their eyes moving around, but always coming back to Lord Darcy. Lady Beverly sat alone near the fire, her eyes

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watching the flames unseeingly. Master Sean and Dr. Pateley were talking in very low tones on the opposite side of the fireplace. Chief Jaque stood stolidly in front of the mullioned window, watching the entire room without seeming to do so.

On the mantelpiece, the big clock swung its pendulum with muffled clicks.

Lord Gisors rose from his seat and came toward the sideboard where Lord Darcy and Father Villiers were talking.

"Excuse me, Lord Darcy, Father." He paused and cleared his throat a little, then looked at the priest. "We're all a little nervous, Reverend Sir. I know it's Good Friday, but would it be wrong to—er—to ask if anyone wants a glass of Xerez?"

"Of course not, my son. We are all suffering with Our Lord this day, and may suffer more, but I do not think He would frown upon our use of a stiff dose of medicinal palliative. Certainly Our Lord did not. According to St. John, He said, 'I thirst,' and they held up to Him a sponge soaked in wine. After He had received it, He said, 'It is accomplished.' " Father Villiers stopped.

" 'And gave up His spirit,' " Lord Gisors quoted glumly.

"Exactly," said the priest firmly. "But by Easter Day His spirit had returned, and the only casualty among the faithful that weekend was Judas. I'll have a brandy, myself."

Only Lady Beverly and Chief Jaque refused refreshment—each for a different reason. When the drinks were about half gone, Lord Darcy walked casually to the fireplace and faced them all.

"We have a vexing problem before us. We must show how the late Count de la Vexin met his death. With the cooperation of all of you, I think we can do it. First, we have to dispense with the notion that there was any Black Magic involved in the death of His Lordship. Master Sean?"

The Irishman rolled Xerez around on his tongue and swallowed before answering. "Me Lords, ladies, and gentlemen, having thoroughly given the situation every scientific test, I would be willing to state in His Majesty's Court of Justice that, by whatever means His Lordship the Count was killed, there was no trace of any magic, black *or* white, involved. Not in any capacity by anyone."

Lady Beverly's eyes blazed suddenly. "By no *human* agency, I suppose you mean?" Her voice was low, intense.

"Aye, Me Lady," Master Sean agreed.

"But what of the punishment of God? Or the evil works of Satan?"

A silence hung in the air. After a moment, Master Sean said: "I think I'll let the Reverend Father answer that one."

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Father Villiers steepled his fingers. "My child, God punishes transgressors in many ways—usually through the purgatorial torture of conscience, or, if the conscience is weak, by the reaction of the sinner's fellow men to his evildoing. The Devil, in hope that the sinner may die before he has a chance to repent, may use various methods of driving them to self-destruction.

"But you cannot ascribe an act like this to *both* God and Satan. There is, furthermore, no evidence whatever that your late father was so great a sinner that God would have resorted to such drastic punishment, nor that the Devil feared of His Lordship's relenting in the near future of such minor sins as he may have committed.

"In any case, *neither God nor the Devil disposes of a man by grabbing him by the scruff of the neck and the seat of the pants and throwing him through a window!*

"Execution by defenestration, my child, is a peculiarly human act."

Lady Beverly bowed her head and said nothing.

Again a moment of silence, broken by Lord Darcy.

"My Lord Gisors, assuming that your father was killed by purely physical means, can you suggest how it might have been done?"

Lord Gisors, who had been at the sidetable pouring himself another drink, turned slowly around. "Yes, Lord Darcy. I can," he said thoughtfully.

Lord Darcy raised his left eyebrow again. "Indeed? Pray elucidate, My Lord."

Lord Gisors lifted his right index finger. "My father was pushed out that window. Correct?" His voice was shaking a little.

"Correct." Lord Darcy acknowledged.

"Then, by God, somebody had to push him out! I don't know who, I don't know how! But there had to be someone in there to do it!" He took another swallow of his drink and then went on in a somewhat calmer voice. "Look at it this way. Someone was in there waiting for him. My father came in, walked toward the window, got up on his desk, and that someone, whoever he was, ran up behind him and pushed him out. I don't know who or why, but that's what *had* to have happened! You're the Duke's Investigator. You find out what happened and who did it. But don't try to put it on any of us, My Lord, because none of us was anywhere near that room when it happened!"

He finished his drink in one swallow and poured another.

Lord Darcy spoke quietly. "Assuming your hypothesis is true, My Lord, how did the killer get into the room, and how did he get out?" Without waiting for an answer from Lord Gisors, Lord Darcy looked at Captain Sir Roderique. "Have you any suggestions, Sir Roderique?"

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The old guardsman scowled. "I don't know. The laboratory was locked at all times, and always guarded when His Lordship was in there. But it wasn't especially guarded when Lord Jillbert was gone. He didn't go in often—not more than once or twice a week. The room wasn't particularly guarded the rest of the time. Anyone with a key could have got in. Someone could have stolen the key from My Lord de la Vexin and had a duplicate made."

"Highly unlikely," Lord Darcy said. "His Lordship wanted no one in that room but himself. On the other hand, my dear Captain, *you* have a duplicate."

Roderique's face seemed to turn purple. He came suddenly to his feet, looking down at Lord Darcy. "Are you accusing *me?*"

Darcy lifted a hand, palm outward. "Not yet, my dear Captain; perhaps not ever. Let us continue with our discussion without permitting our emotions to boil over." The Captain of the Guard sat down slowly without taking his eyes from Lord Darcy's face.

"I assure you, My Lord," the captain said, "that no other duplicate has ever been made from the key in my possession, and that the key has never been out of my possession."

"I believe you, Captain; I never said that any duplicate was made from *your* key. But let us make a hypothesis.

"Let us assume," Lord Darcy continued, "that the killer *did* have a duplicate key. Very well. What happened then?" He looked at Sergeant Andray. "Give us your opinion, Sergeant."

Andray frowned as though concentration on the problem was just a little beyond his capabilities. His

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handsome features seemed to be unsure of themselves. "Well—uh—well, My Lord, this is—I mean—well, if it were me—" He licked his lips again and looked at his wineglass. "Well, now, My Lord, supposing there were someone hidden inside the room, waiting for My Lord Count. Hm-m-m. His Lordship comes in and climbs up on the desk. Then the killer would have run forward and pushed him out. Yes. That's the only way it could have happened, isn't it?"

"Then how did he get out of the room afterward, Sergeant? You have told us that there was no one in the room when you went in through the window, and that the guardsmen outside found no one in the room after you let them in. The room was under guard all that time, was it not?"

"Yes, My Lord, it was."

"Then how did the killer get out?"

The sergeant blinked. "Well, My Lord, the only other way out is through the trapdoor to the roof. He might have gone out that way."

Lord Darcy shook his head slowly. "Impossible. I looked at that rooftop carefully this morning. There is no sign that anyone has been up there for some time. Besides, how would he get down? The tower was surrounded by guardsmen who would have seen anyone trying to go down ninety feet on a rope, and there is hardly any other way. At any rate, he would have been seen. And he could hardly have come down the stairs; the interior was full of the Guard." His Lordship's eyes shifted suddenly. "Do you have any suggestions, Demoiselle Madelaine?"

She looked up at him with her round blue eyes. "No, My Lord. I know nothing about such things. It still seems like magic to me."

More silence.

Well, that's enough of this, Lord Darcy thought. *Now we go on to the final phase.*

"Does anyone else have a suggestion?" Apparently, no one did. "Very well, then; perhaps you would like to know my theory of how the killer—a very solid and human killer—got in and out of that room without being seen. Better than merely telling you, I shall demonstrate. Shall we repair to the late Count's *sanctum sanctorum?* Come."

There was a peculiar mixture of reluctance and avidity in the general feeling of those present, but they rose without objection and followed Lord Darcy across the courtyard to the Red Tower and up the long stairway to the late Count's room.

"Now," said Lord Darcy after they were all in the room, "I want all of you to obey my instructions exactly. Otherwise, someone is likely to get hurt. I am sorry there are no chairs in this room—evidently My Lord de la Vexin liked to work on his feet—so you

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will have to stand. Be so good as to stand over against the east wall. That's it. Thank you."

He took the five-inch brass key from his waistcoat pocket, then went over to the door and closed it. "The door was locked, so." *Click.* "And barred, so." *Thump.*

He repocketed the key and turned to face the others. "There, now. That's approximately the way things were after Lord de la Vexin locked himself in his laboratory for the last time. Except, of course, for the condition of that ruined window." He gestured toward the casement, empty now save for broken shards of glass and leading around the edges.

He looked all around the room, side to side and up and down. "No, it still isn't right, is it? Well, that can soon be adjusted properly. Firstly, we'll need to get that unused oil lamp down. Yonder ladder is a full two feet short to reach a ten-foot beam. There are no chairs or stools. A thorough search has shown that the long-handled hook which is the usual accouterment for such a lamp is nowhere in the room. Dear me! What shall we do?"

Most of the others were looking at Lord Darcy as though he had suddenly become simple-minded, but Master Sean smiled inwardly. He knew that His Lordship's blithering was to a purpose.

"Well! What have we here?" Lord Darcy was looking at the brass key in his hand as if he had never seen it before. "Hm-m-m. the end which engages the lock wards should make an excellent hook. Let us see."

Standing directly beneath the brass globe, he jumped up and accurately hooked the brass ring with the key. Then he lowered the big lamp down.

"What is this? It comes down quite easily! It balances the counterweight to a nicety. How odd! Can it be that it is not empty after all?" He took off the glass chimney, put it on the worktable of the east wall, went back and took out the wickholder. "Bless my soul! It is quite brimful of fuel."

He screwed the wickholder back in and lowered the whole lamp to the fullest extent of the pulley chain. It was hardly more than an inch off the floor. Then he grabbed the chain firmly with both hands and lifted. The lamp came up off the floor, but the chain above Lord Darcy's hands went limp and did not move upward. "Ah! The ratchet lock works perfectly. The counterweight cannot raise the lamp unless one pulls the chain down a little bit and then releases it slowly. Excellent." He lowered the lamp back down.

"Now comes the difficult part. That lamp is quite heavy." Lord Darcy smiled. "But, fortunately, we can use the ladder for this."

He brought the ladder over to the locked and barred door, brac-

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ing it against the wall over the lintel. Then his audience watched in stunned silence as he picked up the heavy lamp, carried it over to the ladder, climbed up, and hooked the chain over one of the apparatus hooks that the Count had fastened at many places in the ceiling.

"There, now," he said, descending the ladder. He looked up at the resulting configuration. The lamp chain now stretched almost horizontally from its supporting beam to the heavy hook in the ceiling over the door. "You will notice," said His Lordship, "that the supporting beam for the lamp is not in the exact center of the room. It is two feet nearer the window than it is to the door. The center of the beam is eleven feet from the door, nine feet from the window."

"What *are* you talking about?" Lady Beverly burst out suddenly. "What has all this to do with—"

"*If you please*, My Lady!" Lord Darcy cut her off sharply. Then, more calmly, "Restrain yourself, I pray. All will become clear when I have finished."

Good Lord, he thought to himself, *it should be plain to the veriest dunce.*

Aloud, he said, "We are not through yet. The rope, Master Sean."

Without a word, Master Sean O Lochlainn opened his big symbol-decorated carpetbag and took from it a coil of cotton rope; he gave it to Lord Darcy.

"This is plain, ordinary cotton rope," His Lordship said. "But it is not quite long enough. The other bit of rope, if you please, my dear Sean."

The sorcerer handed him another foot-long piece of rope that looked exactly like the coil he already held.

Using a fisherman's knot, Lord Darcy tied the two together.

He climbed up on the late Count's desk and tied the end of the rope to another hook above the gaslight—the end with the tied-on extra piece. Then he turned and threw the coil of rope across the room to the foot of the ladder. He went back across the room and climbed the ladder again, taking with him the other end of the rope.

Working carefully, he tied the rope to the chain link just above the lamp, then, taking the chain off the hook, he looped the rope over the hook so that it supported the lamp.

He climbed back down the ladder and pointed. "As you see, the lamp is now supported solely by the rope, which is fastened at the hook above the gaslamp over the window, stretches across the room, and is looped over the hook above the door to support the weight."

By this time, they all understood. There was tenseness in the room.

"I said," continued Lord Darcy, "that the rope I have used is ordinary cotton. So it is, except for that

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last additional foot which is tied above the gaslamp. That last foot is not ordinary cotton, but of specially treated cotton which is called nitred or nitrated cotton. It burns extremely rapidly. In the original death trap, the entire rope was made of that substance, but there was not enough left for me to use in this demonstration.

"As you will notice, the end which supports the lamp is several inches too long, after the knot was tied. The person who set this trap very tidily cut off the excess and then failed to pick up the discarded end. Well, we all make mistakes, don't we?"

Lord Darcy stood dramatically in the center of the room. "I want you all to imagine what it was like in this room last night. Dark—or nearly so. There is only the dim illumination from the courtyard lamps below." He picked up an unlit torch from the workbench a few feet away, then went to the door.

"My Lord Count has just come in. He has closed, locked, and barred the door. He has a torch in his hand." Lord Darcy lit the torch with his pipe lighter.

"Now, he walks across the room, to light the gaslamp above the window, as is his wont." Lord Darcy acted out his words.

"He climbs up on his desk. He turns on the gas valve. He lifts his torch to light the gas."

The gas jet shot a yellow flame several inches high. It touched the nitrated cotton rope above it. The rope flared into hissing flame.

Lord Darcy leaped aside and bounced to the floor, well away from the desk.

On the opposite side of the room, the heavy lamp was suddenly released from its hold. Like some airborne juggernaut, it swung ponderously along the arc of its chain. At the bottom of that arc, it grazed the floor with the brass ring. Then it swung up and—as anyone could see—would have smashed the window, had it still been there. Then it swung back.

Everyone in the room watched the lamp pendulum back and forth, dragging the cotton rope behind it. The nitrated section had long since vanished in flame.

Lord Darcy stood on the east side of the room, with the pendulum scything the air between himself and the others.

"Thus you see how the late Count de la Vexin came to his death. The arc this thing cuts would have struck him just below the shoulder-blades. Naturally, it would not have swung so long as now, having been considerably slowed by its impact with the Count's body." He walked over, grabbed the chain, and fought the pendulum to a standstill.

They all stared fascinated at the deadly weight which now swung in a modest two-inch wobble.

The young Lord Gisors lifted his

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head with a jerk and stared straight into Lord Darcy's eyes. "Surely my father would have seen that white rope, Darcy."

"Not if it were covered with lampblack—which it was."

Lord Gisors narrowed his eyes. "Oh, fine. So that's the end of it, eh? With the lamp hanging there, almost touching the floor. Then—*will you explain how it got back up to where it belongs?*"

"Certainly," said Lord Darcy.

He walked over to the lamp, removed the length of cotton rope, pulled gently on the chain to unlock the ratchet, and eased the lamp up. After it left his outstretched hand, it moved on up quietly to its accustomed place.

"Like that," said Lord Darcy blandly. "Except, of course, that the glass chimney was replaced first. And the rope did not need to be removed, since it had all been burnt up."

Before anyone else could speak, Father Villiers said: "Just a moment My Lord. If someone had done that, he would have had to have been in this room—seconds after the death. But there is no way in or out of this room except the door—which was guarded—and the door to the roof, which you have said was not used. There is no other way in or out of this room."

Lord Darcy smiled. "Oh, but there is, Reverend Father."

The priest looked blank.

"The way My Lord de la Vexin took," Lord Darcy said gently.

Surely they understand now, Lord Darcy thought. He broke the silence by saying: "The lamp was down. There was no one in this room. Then, someone climbed in through the window via the fire ladder, raised the lamp again, and—

"*Chief Jaque!*" Lord Darcy shouted.

But he was a fraction of a second too late.

Sergeant Andray had drawn a concealed sidearm. Chief Jaque was just a little too late getting his own gun out.

There was the sudden ear-shattering shock of a heavy-caliber pistol firing in a closed room, and Chief Jaque went down with a bullet in him.

Lord Darcy's hand darted toward the pistol at his own hip, but before it could clear the holster, Captain Sir Roderique leaped toward his son.

"*You fool! You—*" His voice was agonized.

He grabbed the sergeant's wrist, twisted it up.

There came a second shattering blast.

Sir Roderique fell backwards; the bullet had gone in under his chin and taken the top of his head off.

Sergeant Andray screamed.

Then he spun around, leaped to the top of the desk, and flung himself out the window, still screaming.

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The scream lasted just a bit over two seconds before Sergeant Andray was permanently silenced by the courtyard below.

The celebrations of Holy Saturday were over. Easter Season had officially begun. The bells were still ringing in the tower of the Cathedral of St. Ouen in the city of Rouen, the capital of the Duchy of Normandy.

His Royal Highness, Richard, Duke of Normandy, leaned back in his chair and smiled across the cozy fireplace at his Chief Investigator. Both of them were holding warming glasses of fine Champagne brandy.

His Highness had just finished reading Lord Darcy's report.

"I see, My Lord," he said. "After the trap had been set and triggered—after the late de la Vexin had been propelled through the window to his death—Sergeant Andray went up the fire ladder alone, raised the lamp back to its usual position, and then opened the barred door to allow in the other guardsmen. The fox concealing himself among the hounds."

"Precisely, Your Highness. And you see the motive."

His Highness the Duke, younger brother of His Imperial Majesty, King John IV, was blond, blue-eyed, and handsome, like all the Plantagenets, but at this moment there was a faint frown upon his forehead.

"The motive was obvious from the beginning, My Lord," he said. "I can see that Sergeant Andray wanted to get rid of My Lord de la Vexin in order to clear the way for a marriage which would be beneficial to his sister—and, of course, to the rest of the family. But your written report is incomplete." He tapped the sheaf of papers in his hand.

"I fear, Your Highness," Lord Darcy said carefully, "that it must remain forever incomplete.

Prince Richard leaned back and sighed. "Very well, Darcy. Give it to me orally. Off the record, as usual."

"As you command, Your Highness," Lord Darcy said, refilling his glass.

"Young Andray must be blamed for the murder. The evidence I have can go no further, now that both he and his father are dead. Chief Jaque, who will easily recover from the bullet wound in his shoulder, has no more evidence than I have.

"Captain Sir Roderique will be buried with military honors, since eyewitnesses can and will say that he tried to stop his son from shooting me. Further hypotheses now would merely raise a discussion that could never be resolved.

"But it was not Sergeant Andray who set the trap. Only Captain Sir Roderique had access to the key that unlocked the laboratory. Only he could have gone up there and

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set the death trap that killed the late Count."

"Then why," the Prince asked, "did he try to stop his son?"

"Because, Your Highness," Lord Darcy replied, "he did not think I had enough evidence to convict. He was trying to stop young Andray from making a fool of himself by giving the whole thing away. Andray had panicked—which I had hoped he would, but not, I must admit, to that extent.

"He killed his father, who had plotted the whole thing, and, seeing what he had done, went into a suicidal hysteria which resulted in his death. I am sorry for that, Your Highness."

"Not your fault, Darcy. What about the Demoiselle Madelaine?"

Lord Darcy sipped at his brandy. "She was the prime mover, of course. She instigated the whole thing—subtly. No way to prove it. But Lord Gisors sees through her now. He will wed the lady his father quite properly chose for him."

"I see," said the Prince. "You told him the truth?"

"I spoke to him, Your Highness," Lord Darcy said. "But he already knew the truth."

"Then the matter is settled." His Highness straightened up in his chair. "Now, about those notebooks you brought back with you. What do they mean?"

"They are the late Count's scientific-materialistic notes on his researches for the past twenty years, Your Highness. They represent two decades of hard research."

"But—really, Darcy. Research on Materialism? Of what use could they possibly be?"

"Your Highness, the Laws of Magic tell us how the mind of man can influence the material universe. But the universe is more than the mind of man can possibly encompass. The mind of God may keep the planets and the stars in their courses, but, if so, then He has laws by which He abides."

Lord Darcy finished his brandy. "There are more things in this universe than the mind of man, Your Highness, and there are laws which govern them. Someday, those notebooks may be invaluable." ■

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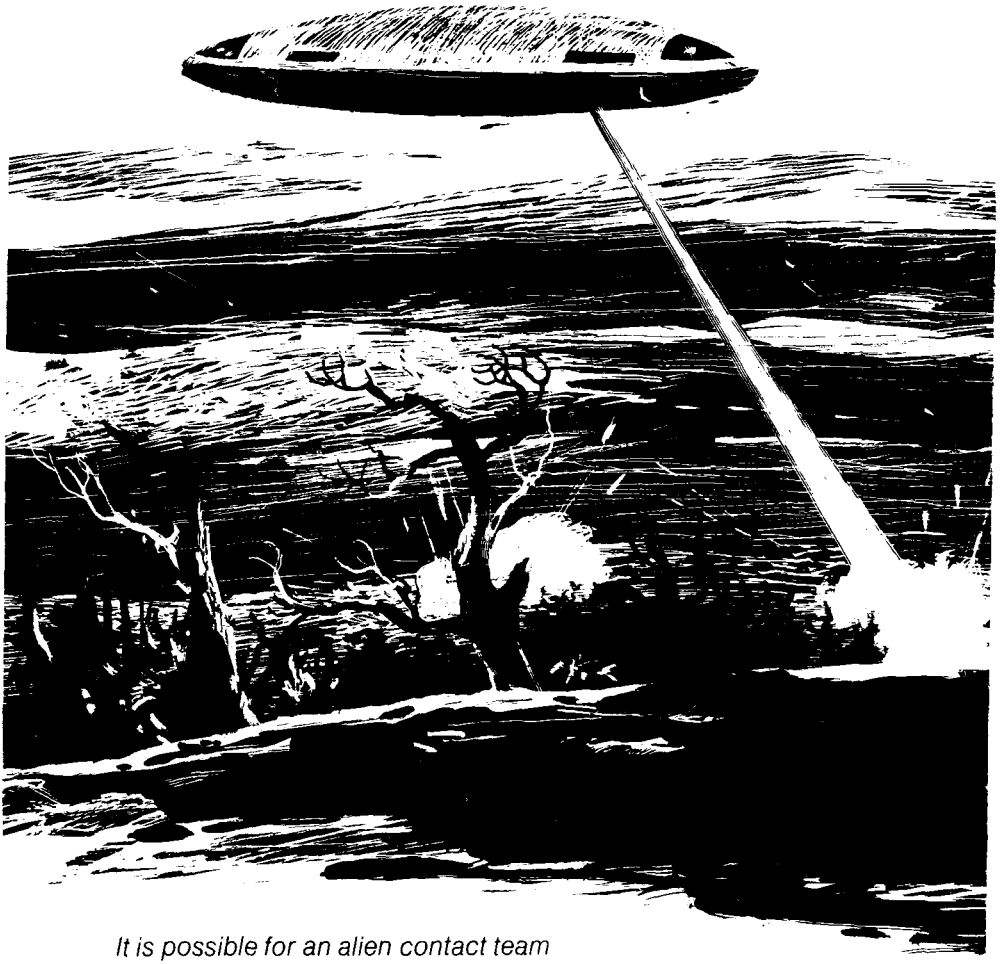

It is possible for an alien contact team to choose exactly the wrong place to land.

DAVID DRAKE

Something shrieked over the firebase without dipping below the gray clouds. It was low and fast and sounded so much like an incoming rocket that even the man on Golf Company's portable latrine flattened instantly. Captain Holtz had knocked over the card table when he hit the dirt. He raised his head above the wreckage in time to see a bright blue flash in the far distance. The crash that rattled the jungle moments later sent everyone scrabbling again.

"Sonic boom," Major Hegsley, the fat operations officer, pontificated as he levered himself erect.

"The hell you say," Holtz mut-

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CONTACT!

VINCENT DI FATE

tered, poised and listening. "Paider, Bayes," he grunted at the two platoon leaders starting to pick up their bridge hands, "get to your tracks."

Then the klaxon on the tactical operations center blatted and everyone knew Holtz had been right again. The captain kicked aside a lawn chair blocking his way to his command vehicle. The radioman scuttled forward to give his powerful commander room in front of the bank of radios. "Battle six, Battle four-six," the tanker snapped as he keyed the microphone. "Shoot." Thirty seconds of concentrated information spat out of the

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speaker while Holtz crayoned grid coordinates in on an acetate-covered map. "Roger, we'll get 'em." Turning to the radioman he ordered, "Second platoon stays for security here—get first and third lined up at the gate and tell Speed I'll be with him on five-two." While the enlisted man relayed the orders on the company frequency, Holtz scooped up a holstered .45 and his chicken vest and ran for his tank.

Golf Company was already moving. Most of the drivers had cranked up as soon as they heard the explosion. Within thirty seconds of the klaxon, the diesels of all nine operable tracks were turning over while the air still slapped with closing breechblocks. Tank 52 jingled as Hauley, its driver, braked the right tread and threw the left in reverse to swing the heavy war machine out of its ready position. Holtz ran up to the left side, snapping his vest closed at the shoulder. He was one of the few men in the squadron who wore a porcelain-armored chicken vest without discomfort, despite its considerably greater weight than the usual nylon flak jacket. In fact, Holtz was built much like one of his tanks. Though he was taller than average, his breadth made him look stocky at a distance and simply gigantic close up. He wore his black hair cropped short, but a thick growth curled down his forearms and up the backs of his hands.

Speed, a weedy, freckled staff sergeant with three years' combat behind him, grasped his captain by the wrist and helped him swing up on five-two's battered fender. As frail as he looked, Speed was probably the best track commander in the company. He was due to rotate home for discharge in three days and would normally have been sent to the rear for stand-down a week before. Holtz liked working with an experienced man and had kept him in the field an extra week, but this was Speed's last day. "You wanna load today, Captain?" he asked with an easy smile. He rocked unconcernedly as Hauley put the tank in gear and sent it into line with a jerk.

Holtz smiled back but shook his head. He always rode in the track commander's position, although in a contact he could depend on Speed to fight five-two from the loader's hatch while he directed the company as a whole. Still smiling, the big officer settled heavily onto the hatch cover behind the low-mounted, fifty-caliber machinegun and slipped on his radio helmet.

"OK, listen up," he said on the company frequency, ignoring commo security as he always did when talking to his unit. He had a serene assurance that his gravelly voice was adequate identification—and that his tanks were a certain answer to any dinks who tried to stop him. His boys were as good and as deadly as any outfit in 'Nam. "Air Force claims they zap-

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ped a bird at high altitude and it wasn't one of theirs. We're going to see whose it was and keep Charlie away till C-MEC gets a team out here. Four-four leads, west on the hardball to a trail at Yankee Tango five-seven-two, three-seven-nine; flyboys think the bird went down around seventy-forty, but keep your eyes open all the way—Charlie's going to be looking too."

Holtz's track was second in line with the remaining five tanks of the first and third platoons following in single file. As each one nosed out of the firebase its TC flipped a switch. Electric motors whined to rotate the turrets 30 degrees to one side or the other and lower the muzzles of the 90mm main guns. The big cannon were always loaded, but for safety's sake they were pointed up in the air except when the tanks prowled empty countryside. Otherwise, at a twitch of the red handle beside each track commander a wall or a crowd of people would dissolve in shattered ruin.

"Well, you think we're at war with China now?" Holtz shouted to Speed over the high jangle of the treads. "Hell, I told you you didn't want to go home—what do you bet they nuked Oakland five minutes ago?" Both men laughed.

The path from the firebase to the highway was finely divided muck after three days of use. The tanks, each of them burdened with fifty tons of armor and weaponry, wallowed through it. There was nothing laughable in their awkwardness. Rather, they looked as implacably deadly as tyrannosaurs hunting in a pack. On the asphalt hardball, the seven vehicles accelerated to thirty-five miles an hour, stringing out a little. Four-four had all its left-side torsion bars broken and would not steer a straight line. The tank staggered back and forth across the narrow highway in a series of short zigzags. From the engine gratings on its back deck, a boy with a grenade launcher stared miserably back at the CO's track while the rough ride pounded his guts to jelly.

Holtz ignored him, letting his eyes flick through the vegetation to both sides of the roadway. Here along the hardball the land was in rubber, but according to the map they would have to approach the downed aircraft through broken jungle. Not the best terrain for armor, but they'd make do. Normally the tanks would have backed up an air search, but low clouds had washed the sky gray. Occasionally Holtz could hear a chopper thrumming somewhere, above him but always invisible. No air support in a contact, that was what it meant. Maybe no medevac either.

Ahead, four-four slowed. The rest of the column ground to a chattering halt behind it. Unintelligible noises hissed through Holtz's earphones. He cursed and reached down inside the turret to bring his

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volume up. Noise crackled louder but all sense was smothered out of it by the increased roar of static. Four-four's TC, Greiler, spoke into the ear of his grenadier. The boy nodded and jumped off the tank, running back to five-two. He was a newbie, only a week or two in the field, and young besides. He clambered up the bow slope of the tank and nervously blurted, "Sir, Chick says he thinks this is the turn-off but he isn't sure."

As far as Holtz could tell from the map, the narrow trail beside four-four should be the one they wanted. It led south, at any rate. Hell, if the MiG was what had gone howling over the firebase earlier the flyboys were just guessing for location anyway. The overcast had already been solid and the bird could have fallen anywhere in III Corps for all anybody knew.

"Yeah, we'll try it," Holtz said into his helmet mike. No reaction from four-four. "God damn it!" the captain roared, stabbing his left arm out imperiously. Four-four obediently did a neutral steer on the hardball, rotating 90 degrees to the left as the treads spun in opposite directions. Clods of asphalt boiled up as the road's surface dissolved under incalculable stresses. "Get on the back, son," Holtz growled at the uncertain newbie. "You're our crew for now. Speed!" he demanded, "What's wrong with our goddam radio? It worked OK at the firebase."

"Isn't the radio," Speed reported immediately, speaking into his own helmet microphone. "See, the intercom works, it's something screwing up off the broadcast freeks. Suppose the dinks are jamming?"

"Crap," Holtz said.

The trail was a half-abandoned jeep route, never intended for anything the width of a tank. They could shred their way through saplings and the creepers that had slunk across the trail, of course, and their massive rubber track blocks spewed a salad of torn greenery over their fenders. But full-sized trees with trunks a foot or more thick made even the tanks turn: grunting, clattering; engines slowing, then roaring loudly for torque to slue the heavy vehicles. Holtz glanced back at the newbie to see that he was all right. The boy's steel pot was too large for him. It had tilted forward over his eyebrows, exposing a fuzz of tiny blond hairs on his neck. The kid had to be eighteen or they wouldn't have let him in the country, Holtz thought, but you sure couldn't tell it by looking at him.

A branch whanged against Holtz's own helmet and he turned around. The vegetation itself was a danger as well as a hiding place for unknown numbers of the enemy. More than one tanker had been dusted off with a twig through his eye. There were a lot of nasty surprises for a man rolling through jungle twelve feet in the air. But if

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you spent all your time watching for branches, you missed the dink crouched in the undergrowth with a rocket launcher—and he'd kill the hell out of you.

Sudden color in the sky ahead. Speed slapped Holtz on the left shoulder, pointing, but the CO had already seen it. The clouds covered the sky in a dismal ceiling no higher than that of a large auditorium. While both men stared, another flash stained the gray momentarily azure. There was no thunder. Too brightly colored for lightning anyway, Holtz thought. The flashes were really blue, not just white reflected from dark clouds.

"That can't be a klick from here, Chief," Speed's voice rattled. Holtz glanced at him. The sergeant's jungle boots rested on the forward rim of his hatch so that his bony knees poked high in the air. Some people let their feet dangle inside the turret, but Speed had been around too long for that. Armor was great so long as nothing penetrated it. When something did—most often a stream of molten metal blasted by the shaped explosive of a B-41 rocket—it splashed around the inner surface of what had been protection. God help the man inside then. 'Nam offered enough ways to die without looking for easy ones.

The officer squinted forward, trying to get a better idea of the brief light's location. Foliage broke the concave mirror of the clouds into a thousand swiftly dancing segments. Five-two was jouncing badly over pot holes and major roots that protruded from the coarse, red soil as well.

"Hey," Speed muttered at a sudden thought. Holtz saw him drop down inside the tank. The earphones crackled as the sergeant switched on the main radio he had disconnected when background noise smothered communications. As he did so, another of the blue flashes lit up the sky. Static smashed through Holtz's phones like the main gun going off beside his head.

"Jesus Christ!" the big officer roared into the intercom. "You shorted the goddam thing!"

White noise disappeared as Speed shut off the set again. "No, man," he protested as he popped his frame, lanky but bulbous in its nylon padding, back through the oval hatch. "That's not me—it's the lightning. All I did was turn the set on."

"That's not lightning," Holtz grunted. He shifted his pistol holster slightly so that the butt was handy for immediate use. "Hauley," he said over the intercom to the driver, "that light's maybe a hair south of the way we're headed. If you catch a trail heading off to the left, hold it up for a minute."

Speed scanned his side of the jungle with a practiced squint. Ten-

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dons stood out on his right hand as it gripped the hatch cover against the tank's erratic lurches. "Good thing the intercom's on wires," he remarked. "Otherwise we'd really be up a creek."

Holtz nodded.

On flat concrete, tanks could get up to forty-five miles an hour, though the ride was spine-shattering if any of the torsion bars were broken. Off-road was another matter. This trail was as straight as what was basically a brush cut could be—did it lead to another section on the plantation that flanked the hardball?—but when it meandered around a heavy tree bole the tanks had to slow to a crawl to follow it. Black exhaust boiled out of the deflector plates serving four-four in place of muffler and tail pipe. The overgrown trail could hide a mine, either an old one long forgotten or a sudden improvisation by a tankkiller team that had heard Golf Company moving toward it. The bursts of light and static were certain to attract the attention of all the NVA in the neighborhood.

That was fine with Holtz. He twitched the double handgrips of his cal-fifty to be sure the gun would rotate smoothly. He wouldn't have been in Armor if he'd minded killing.

The flashes were still intermittent but seemed to come more frequently now: one or two a minute. Range was a matter of guesswork, but appreciably more of the sky lighted up at each pulse. They must be getting closer to the source. The trail was taking them straight to it after all. But how did a MiG make the sky light up that way?

Speed lifted his radio helmet to listen intently. "AK fire," he said. "Not far away either." Holtz scowled and raised his own helmet away from his ears. As he did so, the air shuddered with a dull boom that was not thunder. The deliberate bark of an AK-47 chopped out behind it, little muffled by the trees.

Speed slipped the cap from a flare and set it over the primed end of the foot-long tube. "We can't get the others on the horn," he explained. "They'll know what a red flare means."

"Charlie'll see it too," Holtz argued.

"Hell, whoever heard of a tank company sneaking up on anybody?"

The captain shrugged assent. As always before a contact, the sweat filming the inner surface of his chicken vest had chilled suddenly.

Speed rapped the base of the flare on the turret. The rocket streaked upward with a liquid *whoosh!* that took it above the cloud ceiling. Moments later the charge burst and a fierce red ball drifted down against the flickering background. Holtz keyed the scrambler mike, calling, "Battle six, Battle six; Battle four-six calling."

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He held one of the separate earphones under his radio helmet. The only response from it was a thunder of static and he shut it off again. Remembering the newbie on the back deck, he turned and shouted over the savage rumble of the engine, "Watch it, kid, we'll be in it up to our necks any time now."

In the tight undergrowth, the tracks had closed up to less than a dozen yards between bow slope and the deflector plates of the next ahead. Four-four cornered around a clump of three large trees left standing to the right of the trail. The tank's bent, rusted fender sawed into the bark of the outer tree, then tore free. Hauley swung five-two wider as he followed.

A rocket spurted from a grove of bamboo forty yards away where the trail jogged again. The fireball of the B-41 seemed to hang in the air just above the ground, but it moved fast enough that before Holtz's thumbs could close on his gun's butterfly trigger the rocket had burst on the bow slope of four-four.

A great splash of orange-red flame enveloped the front of the tank momentarily, looking as if a gasoline bomb had gone off. The flash took only a split second but the roar of the explosion echoed and re-echoed in the crash of heavy gunfire. Four-four shuddered to a halt. Holtz raked the bamboo with the cal-fifty, directing the machinegun with his left hand while his right groped for the turret control to swing the main gun. Beside him, Speed's lighter machinegun chewed up undergrowth to the left of the trail. He had no visible targets, but you almost never saw your enemy in the jungle.

The muzzle brake of the 90mm gun, already as low as it could be aimed, rotated onto the bamboo. A burst of light automatic fire glanced off five-two's turret from an unknown location. Holtz ignored it and tripped the red handle. The air split with a sharp crack and a flash of green. The first round was canister and it shotgunned a deadly cone of steel balls toward the unseen rocketeer, exploding bamboo into the air like a tangle of broom straw. Brass clanged in the turret as the cannon's breech sprang open automatically and flung out the empty case. Speed dropped through the reeking white powder smoke evacuated into the hull.

Holtz hadn't a chance to worry about the newbie behind him until he heard the kid's grenade launcher chunk hollowly. Only an instant later its shell burst on a tree limb not thirty feet from the tank. Wood disintegrated in a puff of black and red; dozens of segments of piano wire spanged off the armor, one of them ripping a line down the captain's blue jowl. "Not so goddam close!" Holtz shouted, just as a slap on his thigh told him Speed had reloaded the main gun.

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The second rocket hissed from a thicket to the right of five-two, lighting up black-shrouded tree boles from the moment of ignition. Holtz glimpsed the Vietnamese huddled in the brush with the launching tube on his shoulder but there was no time to turn his machinegun before the B-41 exploded. The world shattered. Even the fifty tons of steel under Holtz's feet staggered as the shaped charge detonated against five-two's turret. A pencil stream of vaporized armor plate jetted through the tank. The baggy sateen of the officer's bloused fatigues burst into flame across his left calf where the metal touched it. Outside the tank the air rang with fragments of the rocket's case. Holtz, deafened by the blast, saw the newbie's mouth open to scream as the boy spun away from the jagged impacts sledging him. Somehow he still gripped his grenade launcher, but its fat aluminum barrel had flowered with torn metal as suddenly as red splotches had appeared on his flak jacket.

Holtz's radio helmet was gone, jerked off his head by the blast. Stupid with shock, the burly captain's eyes followed the wires leading down into the interior of the tank. Pooled on the floorplate was all that remained of Speed. The gaseous metal had struck him while his body was bent. The stream had entered above the collarbone and burned an exit hole through the seventh rib near the spine. The sergeant's torso, raised instantly to a temperature of over a thousand degrees, had exploded. Speed's head had not been touched. His face was turned upward, displaying its slight grin, although spatters of blood made him seem more freckled than usual.

The clouds were thickly alive with a shifting pattern of blue fire and the air hummed to a note unconnected to the rattle of gunfire all along the tank column. The third tank in line, four-six, edged forward, trying to pass Holtz's motionless vehicle on the left. A medic hopped off the deck of four-six and knelt beside the newbie's crumpled body, oblivious to the shots singing off nearby armor.

Hauley jumped out of the driver's hatch and climbed back to his commander. "Sir!" he said, gripping Holtz by the left arm.

Holtz shook himself alert. "Get us moving," he ordered in a thin voice he did not recognize. "Give four-six room to get by."

Hauley ducked forward to obey. Holtz glanced down into the interior of the track. In fury he tried to slam his fist against the hatch coaming and found he no longer had feeling in his right arm. Where the sleeve of his fatigue shirt still clung to him, it was black with blood. Nothing spurting or gushing, though. The main charge of shrapnel that should have ripped through Holtz's upper body had

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impacted numbingly on his chicken vest. Its porcelain plates had turned the fragments, although the outer casing of nylon was clawed to ruin.

Five-two rumbled as Hauley gunned the engine, then jerked into gear. A long burst of AK fire sounded beyond the bamboo from which the first B-41 had come. A muffled swoosh signaled another rocket from the same location. This time the target, too, was hidden in the jungle. Holtz hosed the tall grass on general principles and blamed his shock-sluggish brain for not understanding what the Vietnamese were doing.

With a howl more like an overloaded dynamo than a jet engine, a metallic cigar shape staggered up out of the jungle less than a hundred yards from five-two's bow. It was fifty feet long, blunt-ended and featureless under a cloaking blue nimbus. Flickering subliminally, the light was less bright than intense. Watching it was similar to laying a bead with an arc welder while wearing a mask of thick blue glass instead of the usual murky yellow.

As the cigar hovered, slightly nose down, another rocket streaked up at it from the launcher hidden in the bamboo. The red flare merged with the nimbus but instead of knifing in against the metal, the missile slowed and hung roaring in the air several seconds until its motor burned out. By then the nimbus had paled almost to nonexistence and the ship itself lurched a yard or two downward. Without the blinding glare Holtz could see gashes in the center section of the strange object, the result of a Communist rocket detonating nearby or some bright flyboy's proximity-fused missile. MiG, for Chrissake! Holtz swore to himself.

A brilliant flash leaped from the bow of the hovering craft. In the thunderclap that followed, the whole clump of bamboo blasted skyward as a ball of green pulp.

To Holtz's left, the cupola machinegun of four-six opened fire on the cigar. Either Roosevelt, the third tank's TC, still thought the hovering vessel was Communist or else he simply reacted to the sudden threat of its power. Brass and stripped links bounded toward Holtz's track as the slender black sent a stream of tracers thundering up at a flat angle.

The blue nimbus splashed and paled. Even as he swore, Holtz's left hand hit the lever to bring the muzzle of his main gun up with a whine. The blue-lit cigar shape swung end on to the tanks, hovering in line with the T-shaped muzzle brake of the cannon. Perhaps a hand inside the opaque hull was reaching for its weapons control, but Holtz's fingers closed on the red switch first. The ninety crashed, bucking back against its recoil stop while flame stabbed forward and sideways through the muzzle brake. Whatever the blue glow did to screen the strange craft,

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it was inadequate to halt the point-blank impact of a shell delivering over a hundred tons of kinetic energy. The nimbus collapsed like a shattered light bulb. For half a heartbeat the ship rocked in the air, undisturbed except for a four-inch hole in the bare metal of its bow.

The stern third of the craft disintegrated with a stunning crack and a shower of white firedrops that trailed smoke as they fell. A sphincter valve rotated in the center of the cigar. It was half opened when a second explosion wracked the vessel. Something pitched out of the opening and fell with the blazing fragments shaken from the hull. Magnesium roared blindingly as the remainder of the ship dropped out of the sky. It must have weighed more than Holtz would have guessed from the way the impact shook the jungle and threw blazing splinters up into the clouds.

The tanks were still firing but the answering chug-chug-chug of AK-47's had ceased. Holtz reached for the microphone key, found it gone with the rest of his radio helmet. His scrambler phone had not been damaged by the shaped charge, however, and the static blanket was gone. "Zipper one-three," he called desperately on the medical evacuation frequency, "Battle four-six. Get me out a dust-off bird, I've got men down. We're at Yankee Tango seven-oh, four-oh. That's Yankee Tango seven-oh, four-oh, near there. There's clear area to land a bird, but watch it, some of the trees are through the clouds."

"Stand by, Battle four-six," an impersonal voice replied. A minute later it continued, "Battle four-six? We can't get a chopper to you now, there's pea soup over the whole region. Sorry, you'll have to use what you've got to get your men to a surgeon."

"Look, we need a bird," Holtz pressed, his voice tight. "Some of these guys won't make it without medevac."

"Sorry, soldier, we're getting satellite reports as quick as they come in. The way it looks now, nobody's going to take off for seven or eight hours."

Holtz keyed off furiously. "Hauley!" he said. "C'mere."

The driver was beside him immediately, a dark-haired Pfc who moved faster than his mild expression indicated. Holtz handed him the phones and mike. "Hold for me, I want to see what's happened."

"Did you tell about the, the . . ." Hauley started. His gesture finished the thought.

"About the hole in the jungle?" Holtz queried sarcastically. "Hell, you better forget about that right now. Whatever it was, there's not enough of it left to light your pipe." His arms levered him out of the hatch with difficulty.

"Can I–" Hauley began.

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"Shut up, I can make it," his CO snapped. His left leg was cramped. It almost buckled under him as he leaped to the ground. Holding himself as erect as possible, Holtz limped over to four-six. Roosevelt hunched questioningly behind his gunshield, then jumped out of his cupola and helped the officer onto the fender.

"Quit shooting," Holtz ordered irritably as the loader sprayed a breeze-shaken sapling. "Charlie's gone home for today. Lemme use your commo," he added to the TC, "mine's gone."

He closed his eyes as he fitted on the radio helmet, hoping his double vision would clear. It didn't. Even behind closed eyelids a yellow-tinged multiple afterimage remained. The ringing in his ears was almost as bad as the static had been, but at least he could speak. "Four-six to Battle four," Holtz rasped. "Cease firing unless you've got a target, a real target."

The jungle coughed into silence. "Now, who's hurt? Four-four?"

"Zack's bad, sir," Greiler crackled back immediately. "That rocket burned right through the bow and nigh took his foot off. We got the ankle tied, but he needs a doc quick."

Half to his surprise, Holtz found that four-four's driver and the newbie blown off the back of his own track were the only serious casualties. He ignored his own arm and leg; they seemed to have stopped bleeding. Charlie had been too occupied with the damaged cigar to set a proper ambush. Vaguely, he wondered what the Vietnamese had thought they were shooting at. Borrowing the helmet from four-six's loader, the officer painfully climbed off the tank. His left leg hurt more every minute. Heavily corded muscle lay bare on the calf where the film of blood had cracked off.

Davie Womble, the medic who usually rode the back deck of four-six, was kneeling beside the newbie. He had laid his own flak jacket under the boy's head for a cushion and wrapped his chest in a poncho. "Didn't want to move him," he explained to Holtz, "but that one piece went clean through and was sucking air from both sides. He's really wasted."

The boy's face was a sickly yellow, almost the color of his fine blond hair. A glitter of steel marked the tip of a fragment which had zig-zagged shallowly across his scalp. It was so minor compared to other damage that Womble had not bothered to remove it with tweezers. Holtz said nothing. He stepped toward four-four whose loader and TC clustered around their driver. The loader, his M-16 tucked under his right arm, faced out into the jungle and scanned the pulverized portion. "Hey," he said, raising his rifle. "Hey! We got one!"

"Watch it," the bloodied officer

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called as he drew his .45. He had to force his fingers to close around its square butt. Greiler, the track commander, was back behind his cal-fifty in seconds, leaping straight onto the high fender of his tank and scrambling up into the cupola. The loader continued to edge toward the body he saw huddled on the ground. Twenty yards from the tank he thrust his weapon out and used the flash suppressor to prod the still form.

"He's alive," the loader called. "He's—oh my God, oh my *God!*"

Holtz lumbered forward. Greiler's machinegun was live and the captain's neck crawled to think of it, hoping the TC wouldn't bump the trigger. The man on the ground wore gray coveralls of a slick, rubbery-appearing material. As he breathed, they trembled irregularly and a tear above the collarbone oozed dark fluid. His face was against the ground, hidden in shadow, but there was enough light to show Holtz that the man's outflung hand was blue. "Stretcher!" he shouted as he ran back toward the tracks.

Hauley wore a curious expression as he held out the scrambler phone. Holtz snatched and keyed it without explanation. "Battle six, Battle four-six," he called urgently.

"Battle four-six, this is Blackhorse six," the crisp voice of the regimental commander broke in unexpectedly. "What in hell is going on?"

"Umm, sir, I've got three men for a dust-off and I can't get any action out of the chopper jockeys. My boys aren't going to make it if they ride out of here on a tank. Can you—"

"Captain," the cool voice from Quan Loi interrupted, "it won't do your men any good to have a medevac bird fly into a tree in these clouds. I know how you feel, but the weather is the problem and there's nothing we can do about that. Now, what happened?"

"Look," Holtz blurted, "there's a huge goddam clearing here. If they cruise at five hundred we can guide them in by—"

"God damn it, man, do you want to tell me what's going on or do you want to be the first captain to spend six months in Long Binh Jail?"

Holtz took a deep breath that squeezed bruised ribs against the tight armored vest. Two troopers were already carrying the blue airman back toward the tanks on a litter made of engineer stakes and a poncho. He turned his attention back to the microphone and, keeping his voice flat, said, "We took a prisoner. He's about four feet tall, light build, with a blue complexion. I guess he was part of the crew of the spaceship the Air Force shot down and we finished off. He's breathing now, but the way he's banged up I don't think he will be long."

Only a hum from the radio. Then,

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"Four-six, is this some kind of joke?"

"No joke. I'll have the body back at the firebase in four, maybe three hours, and when they get a bird out you can look at him."

"Hold right where you are," the colonel crackled back. "You've got flares?"

"Roger, roger." Holtz's face regained animation and he began daubing at his red cheek with a handkerchief. "Plenty of flares, but the clouds are pretty low. We can set a pattern of trip flares on the ground, though."

"Hold there: I'm going up freek."

It was getting dark very fast. Normally Holtz would have moved his two platoons into the cleared area, but that would have meant shifting the newbie—Christ, he didn't even know the kid's name! If they'd found the captive earlier, a chopper might have already been there. Because of the intelligence value. Christ, how those rear echelon mothers ate up intelligence value.

"Four-six? Blackhorse six."

"Roger, Blackhorse six." The captain's huge hand clamped hard on the sweat-slippery microphone.

"There'll be a bird over you in one-oh, repeat one-oh, mikes. Put some flares up when you hear it."

"Roger. Battle four-six out." On the company frequency, Holtz ordered, "Listen good, dudes, there's a dust-off bird coming by in ten. Any of you at the tail of the line hear it, don't pop a flare but tell me. We want it coming down here, not in the middle of the jungle." He took off the helmet, setting it beside him on the turret. His head still buzzed and, though he stared into the jungle over the grips of the cal-fifty, even the front sight was a blur. Ten minutes was a long time.

"I hear it!" Roosevelt called. Without waiting for Holtz's order, he fired the quadrangle of trip flares he had set. They lit brightly the area cleared by the alien's weapon. While those ground flares sizzled to full life, Greiler sent three star clusters streaking into the overcast together. The dust-off slick, casting like a coonhound, paused invisibly. As a great gray shadow it drifted down the line of tanks. Its rotor kicked the mist into billows flashing dimly.

Gracelessly yet without jerking the wounded boy, Womble and a third-platoon tanker pressed into service as stretcher-bearer rose and started toward the bird. As soon as the slick touched down, its blades set to idle, the crew chief with his Red Cross armband jumped out. Holtz and the stretcher with the newbie reached the helicopter an instant after the two nearer stretchers.

"Where's the prisoner?" the crew chief shouted over the high scream of unloaded turbines.

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"Get my men aboard first," Holtz ordered briefly.

"Sorry, Captain," the air medic replied, "with our fuel load we only take two this trip and I've got orders to bring the prisoner back for sure."

"Stuff your orders! My men go out first."

The crew chief wiped sweat from the bridge of his nose; more trickled from under his commo helmet. "Sir, there's two generals and a bird colonel waiting on the pad for me; I leave that—" he shook his head at the makeshift stretcher—"that back here and it's a year in LBJ if I'm lucky. I'll take one of your—"

"They're both dying!"

"I'm sorry but . . ." The medic's voice dried up when he saw what Holtz was doing. "You can't threaten me!" he shrilled.

Holtz jacked a shell into the chamber of the .45. None of his men moved to stop him. The medic took one step forward as the big captain fired. The bullet slammed into the alien's forehead, just under the streaky gray bristles of his hairline. Fluid spattered the medic and the side of the helicopter behind him.

"There's no prisoner!" Holtz screamed over the shuddering thunder inside his skull. "There's nothing at all, do you hear? Now get my men to a hospital!"

Hauley tried to catch him as he fell, but the officer's weight pulled them both to the ground together.

The snarl of a laboring diesel brought him out of it. He was on a cot with a rolled flak jacket pillowed under his head. Someone had removed his chicken vest and bathed away the crusts of dried blood.

"Where are we?" Holtz muttered thickly. His vision had cleared and the chipped rubber of the treads beside him stood out in sharp relief.

Hauley handed his CO a paper cup of coffee laced with something bitter. "Here you go. Lieutenant Paider took over and we're gonna set up here for the night. If it clears, we'll get a chopper for you too."

"But that . . .?" Holtz gestured at the twilit bulk of a tank twenty feet away. It grunted to a halt after neutral steering a full 360 degrees.

"That? Oh, that was four-four," Hauley said in a careless voice. "Greiler wanted to say thanks—getting both his buddies dusted off, you know. But I told him you didn't want to hear about something that didn't happen. And everybody in the company'll swear it didn't happen, whatever some chopper jockey thinks. So Greiler just moved four-four up to where the bird landed and did a neutral steer . . . on nothing at all."

"Nothing at all," Holtz repeated before drifting off. He grinned like a she-tiger gorging on her cubs' first kill. ■

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psychesomics:

the emerging science of consciousness

NORMAN SPINRAD

can the human mind learn to understand itself?

We are living in an age that is witnessing the birth of a new science. As surely as chemistry emerged from alchemy during the Renaissance, as surely as psychology emerged from philosophy during the Age of Reason, a true science of consciousness is emerging in our time from the convergence of psychology, physiology, biochemistry, ethology, psychopharmacology, systems analysis, media analysis, and a host of other compartments of knowledge whose final contributions to the whole have yet to be determined.

Much as alchemy laid claim to being the complete science of matter before being superseded and transcended by chemistry and atomic physics, psychology (in diverse and sometimes conflicting schools), biochemistry, biophysics, and even physiology all have some tenuous claim to being definitive sciences of consciousness.

The psychologies of mental states—whether Freudian, Jungian, neo-Freudian, or eclectic—study the mind of man and thus have rival claims to being the science of mind. But is a "science of mind" a true science of consciousness? Behavioral psychology denies the relevance of "consciousness" or "mind" and declares that to understand human repertoires of behavior is to understand man, the thinking animal. Can a science that declares "consciousness" and "mind" irrelevant be a true science of consciousness? Biochemistry, biophysics, and physiology are attempting to describe totally the physical nature of brain, nervous system and endocrine system and how they in-

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teract on a cellular and ultimately molecular level. But would a complete picture of brain, nervous, and endocrine biophysics and biochemistry be a true science of consciousness?

We have an impressive (if as yet incomplete) science of the mind as we subjectively experience it in classical psychology, we have a pretty fair science of human behavior as we observe it externally in behavioral psychology, and we have an ever-more-cogent body of knowledge about the physical equipment in which consciousness is somehow generated. We have a science of the mind and we have a science of the brain, but as yet we have no science of the mind-brain interface, of consciousness itself.

Not quite yet.

Consider some of the unanswered questions about consciousness, beginning with the biggest one of all: just what *is* it? The biochemists and physiologists can give us fairly detailed descriptions of the biological equipment that generates what we subjectively experience as our own consciousness, but they have yet to explain *how* our biological equipment generates consciousness, or just what consciousness *is* in a physical sense. The psychologists have constructed elaborate and useful maps of our psychic territories, but the maps are still full of blank spaces and offer no key to the nature of the interface between thought and matter.

We do not really know how the brain stores memory or generates thought in an absolute physical sense. We do not know many of the physical correlatives of mental disorders, or of other "non-ordinary" but verified mental states such as creativity, hypnotic trance, mystic ecstasy, dreaming, hypnagogia (sleep), or positive hysteria. We can point to physiological and biochemical changes in the body *associated* with some of these mental states, but we cannot delineate *how* these states are generated on a physical level.

We do not even have firm knowledge of the total range of capabilities of human consciousness on a physical or even mental level. Psychosomatic illness is pretty much a demonstrable fact, but the actual linkage between altered mental state and altered somatic state is largely unknown. Less clearly documented than psychosomatic illness but just as real is its reverse: so-called spontaneous remission of so-called incurable diseases, whether through hypnosis, "faith healing," or the patient's influence over his own somatic state by metaphorically transmogrified act of will. An enormous amount of data has been accumulated on telephathy, precognition, psychokinesis, and other so-called extrasensory mental phenomena. While more of it than not seems quite dubious, there does seem to be a preponderant weight of evi-

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dence to suggest that at least some human beings have some capability in some of these areas. Thoroughly documented studies in India have proven that yogis can consciously control what were previously considered strictly autonomic functions such as heartbeat and respiration rates. *How* their altered mental states produce altered somatic states is as yet unknown. It seems clear that the powers inherent in human consciousness even in its present evolutionary state have not yet been fully described.

The very core of all human experience, knowledge, intuition, and logic—the phenomenon of consciousness itself—is the largest gap in our scientific picture of the universe. We have more rigorous knowledge about galaxies a billion light-years away or subatomic particles than we do about that which discovers, remembers, and extrapolates from such knowledge—our own essential selves. At the center of our scientific *weltanschaung* is an enormous void.

Which is not to say that the phenomenon of consciousness will forever remain an unknowable mystery, the preserve of theologians, mystics, and Platonic idealists. For now, in the second half of the Twentieth Century, half a dozen or more established sciences and at least as many aborted or nascent proto-sciences are converging on the mind-matter interface. Some, like psychopharmacology, endocrinology, and brain physiology, are moving inward from the systemic and cellular level toward the molecular and atomic level, where matter and energy are revealed as aspects of each other, ultimately, perhaps, as pattern itself. Others, like media analysis, Noetics, and perceptual psychology, are moving outward from the study of interior mental states to the physical matrices and determinants of what conventional psychology calls the mind. The interface toward which they are converging is the line between internal and external reality, between thought and mass-energy phenomena, between mind and matter. Ultimately, and perhaps sooner than we think, the two trends will meet and meld along that interface between the psychic and the somatic, which is consciousness itself. At that point, the divide between the inner reality of the psyche and the outer reality of mass-energy phenomena will evaporate, giving birth to the new science of consciousness, which might be called *psychesomics,* the science of the somatic and physical nature of mind.

What will the new science of consciousness be like? Predicting what an as-yet-unborn science will discover is a doubly dubious occupation, but it is not all that difficult to predict the sort of questions psychesomics will seek to answer. First and foremost, of course, any science of consciousness must ask

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what consciousness *is*, in empirical phenomenological terms.

If we define the "mind" as the sum total of all the mental states we experience–that is, the subject matter of classical psychology–then we can define "consciousness" as that objective verifiable phenomenon which gives rise to what we experience as internal mental states. As such, consciousness must be simultaneously a phenomenon of energy and/or matter and of the subjective reality inside our heads.

Psychesomics must therefore seek to discover and elucidate the physical mechanisms of memory and thought. A science of consciousness must develop a coherent theory linking our subjective mental experience with the objective universe of matter and energy, encompassing all that is known about both spheres without contradiction. It must then test all aspects of such a theory experimentally. If the experimental evidence contradicts the theory, a new theory must be constructed and the process continued until there is a theory of consciousness comparable in rigor and predictive usefulness to the periodic table of the elements, quantum mechanics, or the biochemist's model of the DNA molecule.

From where we stand today, this may seem a tall order, and in some respects it is. Biologists have only a series of tentative theories of how the brain stores memory and generates thought.

Some contend that memory is stored in the RNA molecules of the brain. Brain tissue is known to be unusually rich in RNA, and since the RNA structure is complex enough to transmit genetic coding, it certainly–at least theoretically–has sufficient information-storage potential. Experiments with planeria worms and with rats tend to show that at least some sort of memories can be transferred by injecting brain RNA from one animal into another.

Other biologists think that memory is coded into the actual pathways between the neurons of the brain. Each neuron (and the brain contains billions of such nerve cells) is connected by synapses to thousands of others, so that the total number of possible neural pathways far exceeds the information-storage capacity theoretically needed to store a lifetime's memories and to serve as the matrix for moment-to-moment thought. The theory here is that memory consists of well-worn paths from neuron to neuron; that nerve impulses, having traveled on a particular neural pathway, have a greater tendency to continue to flow down that pathway than to flow down a fresh path, due, perhaps, to reduced electrical resistance. Memory-traces, then, would be coded into these patterns of reduced electrical resistance in the brain's neural network.

Yet another theory likens the

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brain to a holographic plate and memory to a hologram. A hologram stores visual information as interference patterns, so that information on the total picture is distributed throughout the holographic plate, unlike a conventional photograph where each point on the photographed object has a one-for-one correspondence to a locus on the film. If you cut a piece out of a conventional frame of film, there is a gap in the picture, but any part of a holographic plate will reproduce the holographic image, though the less complete the plate is, the fuzzier the image will be. Proponents of a holographic theory of memory would contend that memory is stored holographically in the brain, either in the neural pathways, the RNA molecules, or electrodynamically as the discharge patterns of brain cells. This would certainly account for the "fuzziness" of some memory, the ability to retrieve apparently lost memories under unusual circumstances (particularly electrical stimulation) and for the ability of people who have lost areas of their brains to sometimes regain lost functions by retraining other areas of the brain to assume them.

Both the RNA storage theory and the neural pathway storage theory might explain memory, but how do they account for present-time thought? This sort of chemical or physiological encoding and decoding simply could not take place fast enough to actually *be* continuous moment-to-moment thought. Moreover, though either RNA or neural pathway encoding might explain the brain's memory-storage capacity, neither even begins to explain what it is that *does* the encoding and decoding or what it is that experiences the end-result as "thought." These are theories of *memory,* not of consciousness, because they do not even begin to bridge the gap between the matter-energy phenomena of the brain and the mental-state phenomena of the mind. They may have a part to play in the formulation of a working theory of consciousness, but neither is a theory of consciousness itself.

The holographic theory, while still only a theory of memory-storage in its present form, may ultimately prove critical in the development of a valid theory of consciousness. While it does not really attempt to bridge the mind-matter interface, it does point the way toward a possible basis for grounding the mental-state phenomena of the mind in the matter-energy phenomena of the brain in a way that contradicts neither our subjective experience of the mind nor our present objective knowledge of the brain. Ironically it may prove to be a better explanation of thought than of memory.

These theories of the physical basis of thought and memory, however, are only half of the current

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input into the emerging science of psychesomics. On the other side of the brain-mind interface, minds are studying their own internal states, trying to relate them more and more to external parameters, trying, as many psychologists have always tried, to objectify a science of mind.

The Freudians, neo-Freudians, and Jungians have concentrated on how external events and inner mental events and structures interrelate and feed back on a content basis, leaving it to the perceptual psychologists to explore how the senses actually transfer information from the external universe into their sphere of study, the interior world of the mind. For their part, the perceptual psychologists have concentrated on how the sense organs and their associated apparatus create sensory images in the brain. Neither have really paid much attention to the relationship between the total sensory image conveyed to us by our sensory apparatus and our inner mental states.

Now, however, Marshall McLuhan's central insight that "the medium is the message" is being extended into a substream of psychesomics, media analysis, whose area of study is exactly that interface between our sensory image of the outer world and our inner mental state: the sensorium.

The sensorium—the total constellation of sensory images transmitted to the brain by our sensory apparatus—*is* our experience of outer reality. Whatever relationships our mental states and structures, brain chemistry and physics, and endocrine system have with external reality are really relationships between these inner factors and our *sensory images* of outer reality. Indeed, it would not be going too far to say that what we experience as "the mind" is the interaction between the sensorium and the biochemical and bioelectrical mechanisms of brain, nervous system, and endocrine system.

Here we begin to approach a major element of a theory of consciousness from the inside out. McLuhan, in his book "Understanding Media," and elsewhere, has given many examples of how alteration of the sensorium has altered inner mental states, or, if you will, has altered consciousness. The invention of movable type and the consequent wide distribution of printed matter and literacy altered human consciousness by putting additional emphasis on the visual component of the sensorium and by encouraging a more sequential, linear mode of thinking. Film montage, by presenting the sensorium with multiple intercut realities, drastically altered our consciousness of time, space, and sequence. Television extended our realtime senses of vision and hearing to the far corners of the world and ultimately beyond, to space and the Moon, altering, among many other things,

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our psychic relationship with the planet Earth, leading directly to the new ecological consciousness. Rock music, with its partial emphasis on the tactile component of sound, has to some extent reoriented our sensoriums toward greater emphasis on hearing and the tactile senses, with a resulting alteration of consciousness that has produced an entire "counterculture."

By studying how alterations of the sensorium have altered our interior mental states, McLuhanistic media analysis has shown us that, in a very real sense, the interface of the senses with our internal biochemical and bioelectrical equipment is the locus of consciousness, indeed may be consciousness itself.

And another nascent substream of psychesomics, psychopharmacology, is trying to come up with the other half of the equation by attempting to systematize and deepen our knowledge of how alterations in our internal chemical states alter our internal mental states. If consciousness is indeed the interface between the sensorium and the biochemistry of brain, nervous system, and endocrine system, then, at least in theory, fully developed sciences of the sensorium and of psychopharmacology should imply a science of consciousness itself.

We can now begin to see what a theory of consciousness would have to be like. It would have to draw upon what we know of brain and nervous system physiology, biophysics, and chemistry, endocrinology, psychopharmacology, the sensorium, and internal mental states. Using systems analysis, information theory, logic, and a good helping of pure intuition, it would have to meld what we know about these areas into a seamless whole which accounts for what we experience as "the mind" in objective mass-energy phenomena terms.

When will it be possible to construct such a hypothesis and thereby create a true science of psychesomics? The answer, I believe, is now. To propose a theory of consciousness is not to claim that the theory is necessarily proven. To say that the existence of a theory of consciousness creates a science of consciousness is not to imply that the full subject matter of that science has necessarily been thoroughly explored. Chemistry was a science before the periodic table was fully elucidated, physics was a science before fine atomic structure was pinned down, and today astronomy is a science even though it presents several contradictory theories of the nature of the universe. A science of consciousness comes into being when one or more theories of consciousness are proposed which can be either confirmed or proven invalid by classical scientific method. A science comes into being when it has a subject matter to be explored experimentally and observationally and when it has at

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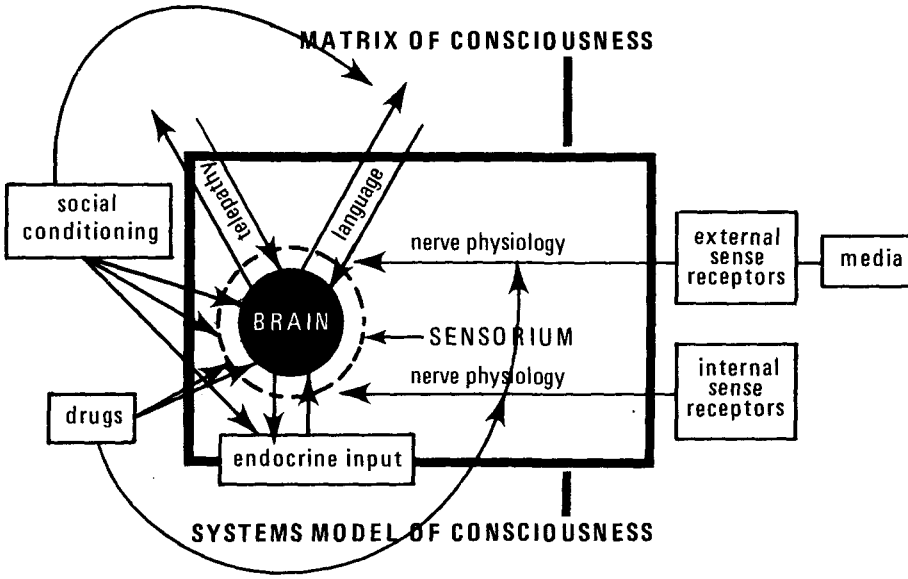

least some theoretical parameters for that exploration, not when it has *completed* its work.

With that large disclaimer, I would like to present a hypothetical theory of consciousness, not so much to contend that it is necessarily valid, as to demonstrate by example that it is possible to construct tentative theories of consciousness from data presently available; that in this sense, at least, a science of psychesomics exists right now.

Let's start by organizing the obvious in a systematic manner, by putting together a systems model of consciousness in terms of what we know about inputs, outputs, and subsystems. (See diagram.)

Consider the brain itself as one subsystem of consciousness, the central subsystem through which must pass the inputs and outputs of all the other subsystems. Three subsystems located within the human organism input into the brain: the biochemistry of the body (factors like endocrine balance, blood-sugar level, et cetera), the internal sensory system (somatic senses, such as hunger, muscular tension, sexual arousal, fatigue), and the external sensory system (vision, hearing, smell, taste, touch, thermal sensitivity, and perhaps other more subtle senses of which we are not yet consciously aware). The body biochemistry system has a feedback relationship with the brain; the sensory systems are one-way conduits for input data, and are in turn functioning in a complex biochemical matrix. Already, we see that on a sheer animal level a brain in a living body with sense-

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receptors is a system of considerable complexity and many intertwined feedback loops. Your dog is certainly capable of non-predictable behavior, he does too have a "personality"!

But in addition to our biological subsystems and sub-sub-systems whirling ever-changing patterns of electrical impulses through the neuron tissue of our brains, we have piled on our own complications and recomplications. We have created *language.* (Or language has created us?) Language is information put into the brain or output from it which is coded in a way that enables it to remain relatively unaffected by the vagaries of our biochemical matrix. Language is perceived as pure symbol, not sensory experience: words, music, mathematics. As such, it is yet another separate subsystem in a feedback relationship with the human brain.

The body biochemistry and sensory subsystems interface on the sensorium, or to put it another way, by interfacing, they form the sensorium. Thus the sensorium is the total matrix of the reality we perceive, "the little man behind our eyeballs." Only he isn't behind our eyeballs all the time. At times, the major focus of our consciousness resides in a portion of the sensorium other than vision, such as when we're making love, or listening intently to music.

But even the sensorium is not a system which contains consciousness. For language, man's perception and creation of transsensory symbols, inputs into the total consciousness system independent of the sensorium, though using its input channels.

The total human consciousness system may be defined as the system containing all the previously mentioned subsystems, sub-sub-systems, and feedback loops. Quite a bowl of spaghetti, isn't it? And its total configuration is never constant from moment to moment. If you took timewise slices, no instantaneous constellation of patterns would ever repeat. So much for determinism.

But the complications don't end when we have encompassed the boundaries of the human consciousness system, for since the invention of culture and artifact, the human consciousness system has entered into a complex series of feedback relationships with the external environment. We can alter our body biochemistry subsystem with drugs, systems of exercise and breathing, electrical stimulation, surgery, meditation, air pollution, diets, and so forth. Our cultural patterns–laws, esthetics, religions, music, color preferences, art, beliefs, et cetera–create internal events in the human consciousness system and are in turn creations of human consciousness. Brain electrical fields may interact harmonically under some conditions with other

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brain fields or environmental electrical fields—yet another possible feedback relationship between the human consciousness system and the external environment. We seem to invent more such feedback relationships every day: art forms, drugs, cultural patterns, new sciences, electronic extensions of our senses.

Where does what we experience as "the mind" actually reside in this almost infinitely complicated human consciousness system? By now, the answer seems obvious. The mind, our moment-to-moment mental states colored with memory and expectation, is not localized or focused in *any* of the subsystems of human consciousness. It is an overall phenomenon of the human consciousness system itself. The total system of systems is the total matrix of the mind, and consciousness is distributed throughout the human consciousness system. It is a second-order pattern phenomenon, a "pattern of patterns."

Or, to come at it from the other direction . . .

We have three basic theories of how memory is stored in the brain. Either it is chemically encoded in brain RNA or some other molecule or molecules, or it is patterns of relative electrical resistance imprinted on neural pathways, or it is some kind of pattern in the electrical impulses perpetually cross-zipping from neuron to neuron.

Or, of course, the total phenomena of memory could involve two or three of these encoding systems. Perhaps memories are stored on the physiological, molecular, and electronic levels in some unknown combination. But at any rate, these three methods or combinations thereof seem to be the only ways in which the brain can store memories.

Let's look at just what inputs for storage. The major portion of input to the consciousness system comes through the sensory systems as a nerve impulse, as charges of electricity. Even the pure symbols of language are still transmitted as bioelectricity. The rest of the input comes from the body biochemistry system on a molecular level. Since our memory input comes from a bioelectric and biochemical bouillabaisse, it is quite likely that some memory may be coded into RNA or other molecules.

But when we move from memory-storage to moment-to-moment thought, to mental event, to the realtime phenomena of the mind, only an electronic system seems fast enough to account for what we observe happening inside our minds and in the world around us. We can assimilate a wavefront of visual signal every 1/24 of a second. We can encode or decode language as fast as two thousand words a minute. Pilots and racing drivers have reaction times measured in tenths of a second or less,

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not for mere reflex arcs, but with their brains circuited into the reaction process.

Thought seems to move at speeds far more characteristic of electronic phenomena than of chemical or physiological phenomena. So we will propose what seems a pretty likely (though as yet unverified) hypothesis: that consciousness must be at least partially an electronic-level phenomenon.

So let's take another look at the holographic theory of memory-storage and extend it to the instantaneous constellation of mental states of the realtime mind. We know that the millions of neurons in the brain are in a perpetual state of electronic flux, firing nerve impulses back and forth in ever-changing patterns along billions of possible neural pathways. We know that sensory data is pouring into this system as wavefront after wavefront of bioelectric nerve impulse. We know that the body biochemistry system is constantly altering the chemical matrix of these electronic events, perhaps somehow even kicking RNA memory up into the electronic level from time to time. (Dreams? Hallucinations? *Déjà vu*? Schizophrenia? What else?)

Interestingly enough, all subsystems of the human consciousness system input into this total electronic flux in one way or another. Apply the holographic theory of memory to one moment of this flux isolating the timewise slice as a constellation of memory bits. If the holographic theory is correct, this timewise slice of consciousness is diffusely stored throughout the total instantaneous electrical pattern. As are other constellations of memory bits from the timestream of the mind.

Now start time moving again. More wavefronts of electronic data enter the system from the senses, from internal mental events, encoding new memories into it electroholographically. But since all memory bits are stored holographically, former patterns do not have to be displaced or destroyed to make room for the new until the total system is saturated. The electronic memory bits move around areas of brain tissue, stored as something analogous to standing wave patterns. All the "standing wave patterns" of electronic impulses in the brain at any given moment *are* consciousness at that given time, forming a transtemporal continuum, a kind of four-dimensional hologram.

This four-dimensional hologram has definite mass-energy existence as electronic impulses in the brain; it is not a mental state construct.

But it does contain all the elements of the "human consciousness system." It does perform all the functions of "the mind." Might it therefore not *be* the human consciousness system in both mass-energy and mental state terms? If this

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total electroholographic pattern has one-for-one correspondence with a functional and systems definition of human consciousness, would that not make it consciousness itself?

Whether ultimate investigation will confirm, modify, or invalidate this theory of consciousness, it *is* a theory of consciousness which unites mental state and mass-energy levels, proving, if nothing else, that such theories of consciousness can now be formulated. Proving that a science of psychesomics is a present possibility.

Once it has a theory to consider—in this case the electroholographic theory of consciousness—scientific inquiry must begin to ask two major questions. How can this theory be tested observationally and experimentally? If proven valid or partially valid, what good is it? In fact, it might be argued that theories, plus the work of answering these two questions about them, are what any science is all about.

What sort of experimental and observational areas of exploration would tend to prove, disprove, or modify such an electroholographic theory of consciousness? If the human consciousness system can be defined as the sum total of all subsystems of human consciousness, then a total physiological, biochemical, bioelectric picture of all the subsystems will be a complete picture of the total system in mass-energy terms as well. That is, once we have complete descriptions of the workings of our sensory systems, our body chemistry system, our nervous system, and our brain on physiological, cellular, molecular, and electronic levels, we will have a physical description of consciousness. We will not have a theory of consciousness, we will have hard scientific *knowledge* of what consciousness is and how it operates.

Therefore, all the current work in areas of brain chemistry, psychopharmacology, brain and nerve physiology, genetics (insofar as genetics is a study of RNA and DNA on a molecular level), biofeedback, electronic stimulation of the brain, chemical memory transfer, and all other studies of human consciousness subsystems is directly applicable toward proving, disproving, or modifying theories of human consciousness with hard scientific fact. This is another sense in which a science of psychesomics already exists today.

For the purposes of the specific electroholographic theory of consciousness, the key question, of course, is where and how are memories and thought generated and held in the matrix of the brain? Can the four-dimensional hologram of "standing wave patterns" of electronic nerve impulses be detected, recorded, and ultimately decoded? In theory, at least, if such a phenomenon exists, the

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answer must be yes. The growing sophistication of electroencephalography through the burgeoning interest in biofeedback techniques is moving us in this direction. Ultimately, psychopharmacology must seek to connect the molecular chemistry of the brain with the electronic nerve impulse level if it is to reach the point where it can really prescribe drugs designed to create any given mental state. Within ten years, we should *know* where and how memories and thoughts are contained in a physical matrix. Within ten years, we should have at least a rough *description* of consciousness as a mass-energy phenomenon, not just one or more unproven theories.

What good would such a science of psychesomics be? What insights would we gain from it? How could it improve or alter our lives? Let's look at a few random areas psychesomics might impinge upon as an applied science.

When we do have a complete and proven theory of memory and thought, I would suspect that it would prove to be somewhat more complicated than the electrohologràphic theory of consciousness, which leaves some significant questions unanswered. For instance, there is much evidence that at least some memory is stored in brain RNA. Perhaps consciousness consists of a series of electrohologrames, each one associated with a general area of the brain. We know that many cerebral functions are to some extent localized. Electronic data from the sensory channels enter the appropriate electrohologram (through a switching pattern? or by direct nerve-circuit connection?) along with other electronic patterns created by internal cerebral event. Through attenuation of signal, trivial data and noise are extinguished (possibly through dreaming?) and the more significant patterns are retained as short- and medium-term memory in the electrohologrames.

But since the accumulation of memory patterns in the electrohologrames would eventually saturate the electronic matrix, patterns that persist long enough, or that group into similar meta-patterns, or both, may somehow become imprinted on RNA molecules and thus pass from the electrohologràphic thought and storage system into more permanent and static molecular memory banks.

If this is so, there may be a mass-energy correspondence to Freud's notions of conscious and unconscious minds. The unconscious may consist of the RNA memories, the conscious may be the electrohologràphic complex. Even the Jungian notion of the "Collective Unconscious" might fit in. The Collective Unconscious might turn out to be species RNA coding inherited from the genes that determine brain chemistry.

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There is plenty of evidence to show that other species have such species RNA memory coding—the so-called instinctive behavior patterns of nesting and migrating birds, social insects, trapdoor spiders, wolf packs, and thousands of other species may very well be just that.

Most psychoses, then, may turn out to be imbalance or dysfunction between the electroholographic mind and the RNA memory banks. It is known that drugs such as LSD can bring on schizoid and paranoid mental states. Such drugs might do one or both of two things. They might interfere with the electroholographic mind by tending to break up the patterns, or they might cause an undue amount of RNA-coded memories to be kicked up to the electroholographic level, interfering in its vital function as realtime data processor. People who are "washed over" by drugs may have had so much interference in their electroholographic minds that the patterns lost their temporal continuity and therefore their realtime stability. Schizophrenia could be a similar effect caused by a malfunction somewhere in the body biochemistry system. A fully developed science of psychesomics would be able to prescribe specific medicine for specific mental malfunctions. Or for that matter, specific drugs to induce any desired mental state.

A mature science of consciousness might come up with some answers about so-called extrasensory powers, which may turn out to be harmonic relationships between the electroholographic mind and other cerebroelectrical fields, or even other environmental electrical fields. If so, it should be possible to bring these electrofield interactions under more systematic conscious control and build extensions and amplifications of them in hardware, as we've done for our other senses.

Psychesomics may also help our evolutionary perspective. From a psychesomics viewpoint, we can define the evolution of consciousness as the evolution of total consciousness systems. The original organisms—the viruses-genes—*are* DNA molecules, so they obviously can have only one consciousness system, molecular coding. Their behavior, therefore, would be automatic and deterministic. Single cell organisms already have rudimentary sensory systems in addition to molecular programming, so they already have complex consciousness systems encompassing several interacting subsystems, and their actions are not quite predictable. By the time you get to complex multicellular animals with brains and spinal cords, complex endocrine systems, and sophisticated sensory equipment, you've got the ingredients for the electroholographic mind to make its appearance. At what phylogenic level this takes place is currently hard to pinpoint, probably

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somewhere between reptiles and mammals. Once the electroholographic mind makes its evolutionary appearance, the trend seems to be for proportionally ever more elaboration of the electroholographic consciousness until mice become men at the end of a smoothly continuous evolutionary development.

But since the tendency is for increasingly complex systems to generate ever more additional subsystems, the human consciousness system that evolved biologically has continued to evolve through the new subsystems it keeps creating for itself.

In these terms, it is an uncontrovertable fact that the evolution of human consciousness has continued past the phylogenic development of *Homo sapiens* as a species. One need only enumerate the subsystems of human consciousness that have evolved in cultural and historic times: language, the extended senses of the media, drugs, meditative techniques, biofeedback, logic, science.

On one hand, this implies that questions such as "Are dolphins sentient?" are meaningless. The real question should be: Can we describe the subsystems of dolphin consciousness and therefore the dolphin's total consciousness system? Consciousness is not even remotely unique to man. What is unique to man is *human* consciousness. "Sentience" is entirely an anthropocentric term.

On the other hand, a psychesomic perspective on evolution seems to imply that the direction of the evolution of consciousness is toward ever-increasing freedom from deterministic processes. The more subsystems a consciousness system contains, the more complex and genuinely unpredictable it becomes and the more new subsystems it generates—a geometrically progressive evolution toward total conscious control of ourselves and our destinies. A science of consciousness itself would be a major advance along this evolutionary vector.

And as a science of consciousness explores the very phenomena which created it, it will generate by its action new levels of consciousness for further exploration. As soon as the human consciousness system achieves a total knowledge of its subsystems, it will become a subsystem of a still larger system which includes the previous total human consciousness system plus a viewpoint outside it. Thus can a science of psychesomics consciously set out to evolve the human consciousness system which created it to ever more sophisticated and expanded levels of consciousness. Thus can we take the controls of our further conscious evolution in our own hands and quite literally put ourselves in destiny's driver's seat. ■

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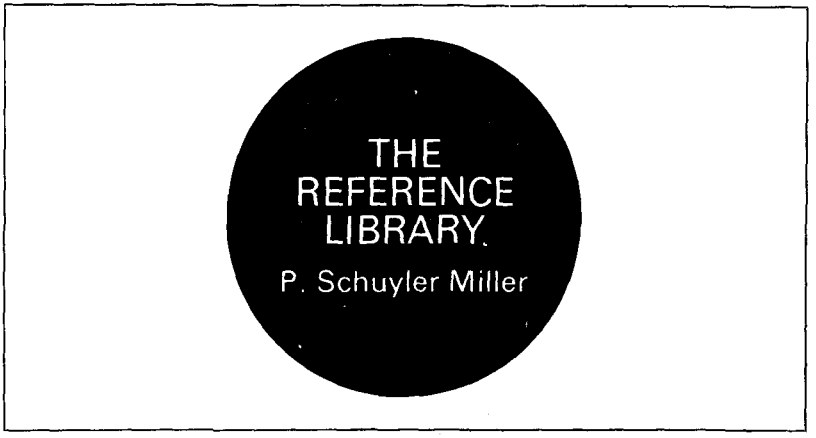

WE REMEMBER ARISIA

Two powerful humanoid races have been battling it out for millennia through the universe. Finally one is forced to flee, hunted by the victors. Some of the escaping starships find Earth and carve out subterranean refuges. Life here is primitive but promising, and the hidden starmen resolve to accelerate its development, so that they will have heirs to whom they can pass on their scientific and philosophical secrets. In a few generations Australopithecines or Neanderthalers are converted into "true" men like their gods from space. Natural catastrophes (or attacks from pursuing enemies) bring the early civilizations crashing down, and nearly all traces of them are obliterated, but a few starmen have survived in their refuge cities, and they begin again.

Sound like a garbled version of the conflict between Arisia and Eddore which Dr. E.E. Smith chronicled here in Astounding, in his "Lensman" stories? Like the plot of innumerable other science-fiction yarns? It is the scenario which a Swiss, Erich von Däniken, has developed in three immensely popular books, "Chariots of the Gods?" and "Gods from Outer Space" (1968) and "Gold of the Gods" (1972), with a fourth book, "In Search of Ancient Gods," coming from Putnam this fall. (The first two books are Bantam paperbacks at $1.25 each. "Gold of the Gods" is a Putnam hardback at $6.95.)

Von Däniken does not claim that he believes this story of godlike beings from outer space, so like ourselves that they could interbreed with us after the initial genetic tinkering was done. In that, his books are unlike Velikovsky's and unlike the "Shaver mystery" published in *Amazing Stories* in the 1940's. Be that as it may, millions of people have bought his books and do believe him, and publishers throughout the world are scrabbling for similar books to capitalize on the

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boom. There have been at least two TV specials (which I didn't see) and a German-made film based on von Däniken's books, which I did see and recommend for its superb photography and professional presentation, though not for its arguments. If only orthodox archaeology had the benefit of the money and expertise to tell its story, that has been put into the "Chariots" film!

There was a lengthy article on von Däniken in the December 1973 *Esquire,* and a short interview in the August issue of our rival and contemporary, *Vertex.* Von Däniken gives as his principal sources a French book, "The Morning of the Magicians" by Louis Pauwels and Jacques Bergier, and a series of books by another Frenchman, Robert Charroux. I haven't read "Magicians," which was published in an American edition by Stein and Day in 1964, and I have only skimmed the paperback editions of two of Charroux' books, "Forgotten Worlds" (Pyramid Books, $1.25) and "The Gods Unknown" (Berkley Books, also $1.25). I have read three of the other imitations, one rather stumbling refutation, and a very interesting complement, "The Spaceships of Ezekial" by Josef F. Blumrich, a NASA engineer. There are three or four more books that I saw but didn't get to.

Judging from what I have seen and heard of their general readership, Velikovsky's and von Däniken's books have quite different followings. "Worlds in Collision" and its sequels appealed very strongly to religious fundamentalists, fundamentalist Christians at least. Here was an internationally known "scientist," a scholar who had devoted thirty years of study to his book, who wrote that the Bible told the literal truth. Here was scientific refutation for the atheist evolutionists and their godless teachings. Von Däniken and his followers, on the other hand, are claiming that the gods—and God—were creatures from other planets who made men out of apes or worse, and that the world's legends and traditions, including the Bible and even heathen myths, are garbled memories of these things.

The von Däniken converts, it seems to me, are part of the major element in Western society which looks back with longing on the magic of a Golden Age, rejects the impenetrable reasoning of scientists, and is confident that they too could enjoy these wonders if orthodoxy and the Establishment would permit. It is not exclusively a Western reaction; books by the Russian-born Australian, Andrew Tomas, in particular, are full of Russian references in the same vein. They are, of course, a basic part of the theosophical and occultist doctrines on which all these books draw heavily. And outside the religious circle, Velikovsky appeals to this same group.

People find it strange that most science-fiction writers, who use all these themes and materials in their stories, will not "buy" them at all. The same situation arose with the Shaver stories: science-fiction readers were not scandalized because they were bad stories, but because

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the magazine and its editor claimed they were true. Raymond Palmer knew very well that it was the lunatic fringe who would buy and believe them, and that their gain would more than make up for the loss of disgusted and infuriated SF fans. As writers and readers, most of us feel pretty strongly that we know the difference between fiction and fact.

"Chariots of the Gods?"—published first as a Swiss newspaper series, then in a German edition, and finally in other languages as its success became evident—strikes me as the kind of book Charles Fort used to put together from odd yarns, newspaper clippings, tall tales, and what have you. Fort's tongue was securely in his cheek as he said: "Prove my scenario doesn't fit the data just as well as the orthodox versions." Von Däniken is using the same kind of material, but not as well. He obviously isn't the scholar Fort was—or Velikovsky, for that matter.

"Gods from Outer Space" is a better book in that von Däniken had the time and money to see for himself some of the wonders—the Nazca figures, Easter Island, India—he had only heard of before. In "Gold of the Gods," however, he seems to have either been completely taken in by hoaxers or to have joined forces with them. The *Miami News* did some probing and reported that Father Carlo Crespi, who is shown in the book holding some remarkable golden plaques decorated with elephants, dinosaurs, fairy-faced flowers, and unknown symbols, is a noted eccentric and jokester. The Ecuadorian caverns from which the golden tablets allegedly came, and where other wonders are said to exist—they are one of the subterranean hiding places of the extraterrestrials—are said to contain "nothing but birds." Extraterrestrial birds, von Däniken hints, but just birds. (But that is exactly what you'd tell a reporter from Miami if you were trying to keep a treasure-vault concealed.)

I'd like to offer a conjecture of my own here. The *New York Times* for May 13, 1973 reported the discovery in southern Colombia—just over the border from Ecuador and van Däniken's caves—of deep grave shafts which have produced some millions of dollars' worth of golden ornaments and artifacts. Most of them were smuggled into Ecuador and melted down into bullion or sold to dealers in antiquities. Colombian archaeologists finally got wind of the find and the Government stopped, or claims to have stopped, the looting, but not before a number of politicians became very affluent. The things von Däniken shows are certainly not Indian work—they look more like kindergarten work—but this could be a way of converting Colombian antiquities into Ecuadorian antiquities.

I once estimated that it would take a shelf at least as large as the *Encyclopaedia Britannica* to refute, point by point, one of Velikovsky's books. Each claim would have to be traced to its source, other data checked out, alternative explanations found and evaluated for "facts" that are real and not just rumor. It took Velikovsky thirty

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years to write his first books; it would take longer to refute them—a principal reason why orthodox scientists haven't done it in their spare time. (I've been checking references for a local archaeologist, and it's slow work.)

It would take longer and add up to many more words to "answer" von Däniken and his imitators, because they rarely tell you where they got their information. The one attempt I have seen is a paperback, "Crash Go the Chariots" (Lancer, $1.25) by a fundamentalist clergyman, college professor, and sometime biblical archaeologist, Dr. Clifford Wilson. He makes mincemeat of some of von Däniken's "facts" but rather spoils what he has gained by resorting to orthodox revelation for most of his argument.

Much more interesting is Josef Blumrich's "The Spaceships of Ezekial" (Bantam, $1.25). Blumrich draws on NASA archives to point out that in 1964 one of his colleagues at Huntsville designed a functional reentry ship which, with a few modifications, fits the description of the ships(?) Ezekial saw near Babylon ca. 592 BC and later, and which he described in rather figurative and mystical terms in the biblical account of his experience. The "wheels within wheels" may be counterrotating helicopter blades used to replace the landing craft's rocket jet in the atmosphere, or they may have been all-purpose landing gear of a kind on which Blumrich hopes to get a patent. This technical part of his book is fascinatingly plausible: it is just the kind of thing Hal Clement would work out if he were telling the Ezekial story as fiction. I can't quite buy other parts of Blumrich's scenario, though. I find it hard to believe that the destruction of a city by extraterrestrials would have escaped mention in the busy archives of the time and place, or that their mountaintop temple-cities would have escaped the archaeologists.

It would take the rest of this year to comment adequately on details of von Däniken's "evidence." Some of his competitors are more accurate in their data than he is. (The electrolytic batteries described some years ago by Willy Ley in *Galaxy* and made by a General Electric engineer date from 200 BC, not 2000 BC. The ancient Sumerian who describes the earth from on high was Etana, not Gilgamesh or Enkidu.) Although the Russian-born Australian, Andrew Tomas, places great emphasis on the Atlantis story and the wonders described by such occultists as Madame Helena Blavatsky, his "We Are Not the First" (Bantam, $1.25) and "The Home of the Gods" (Berkley, $1.25) are not as sloppy as von Däniken in the "wonders" both of them describe. He seems more widely read in more solid sources than the Swiss. (Charroux really runs wild in mysticism and the occult, which is one reason I didn't make time to read the two books I mentioned previously.) Tomas, for example, makes clear how the pyramid cultists can find such impressive information in the dimensions of Cheops' pyramid. To make the perimeter of the pyramid

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equal to the circumference of a circle drawn with its height as radius, you just change the value of "pi," and "even off" the angle the sides make with the base. (See also Martin Garner's department in the June 1974 issue of *Scientific American.)*

All of these books cover many of the same things. The markings on the Peruvian desert . . . ancient paintings of men in "space suits" with round heads like Charlie Brown or Gelett Burgess's "goops" (or most children's drawings of people) . . . Easter Island . . . perpetual lights . . . levitation (to account for moving those huge stones) . . . and legends from all parts of the world. Russians seem to have contributed as many strange stories as anyone (the Chinese yarns leak out, but are unverifiable at the moment). Perhaps the best one-volume compilation, with good photos and firsthand descriptions, is "In Search of Ancient Mysteries" by Alan Landsburg, producer of good, solid TV science programs as well as one of the von Däniken shows, and his wife, Sally (Bantam, $1.50). They also went and looked at things themselves.

The books as a whole are a mishmash of nonsense, occultism, rationalized mythology, and legitimate phenomena that have not been reasonably explained. I'd feel better about the ruined cities and inscriptions of Brazil if a modern archaeologist would say, "I went there, and looked, and they weren't there." Instead, the "Handbook of South American Indians" simply doesn't say anything. Allegedly there is a ruined city under about eighteen feet of water off the coast of Bimini in the Bahamas. Several of these books have photographs of huge blocks about which amazing claims are made. Are they there, or aren't they, and what are they? (I guess I could go look if I were really concerned.) I don't believe the multimillion-year-old shoe prints are shoe prints, and I don't believe (as Charroux seems to) that a frog can grow inside a stone block . . . or that, as even von Däniken seems to, there are a host of documented cases of alchemists making gold. The "Book of Dzyan" is on the same shelf with the "Necronomicon" (and I really expected to find that quoted with the other ghost classics).

On the other hand, I do not—and I doubt that any Analog reader does—deny that extraterrestrials may have visited Earth repeatedly in the past. I just have never seen any evidence that they were here—including that presented by von Däniken, Tomas, Charroux, the Landsburgs, Brinsley le Poer Trench ("Temple of the Stars": Ballantine, $1.50), W. Raymond Drake ("Gods and Spacemen in the Ancient East" or ditto "Ancient West": Signet, $1.50), or the others I've never seen, let alone read. As far as I am concerned, we *are* the first, and could do just as remarkable things, in the same way, as our ancestors. Our gods came from inner space—inside our heads—and so did the pictures we made of them.

After all, we *saw* them, didn't we?

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SOME TRUST IN CHARIOTS
Edited by Barry Thiering and Edgar Castle • Paperback Library, New York • No. 445-00586 • 128 pp. • 95¢

This paperback refutation of von Däniken's "Chariots of the Gods?" showed up on my corner newsstand too late to get in the recent survey. It consists of short comments by sixteen Australian scientists, historians, teachers, philosophers and clergymen, who had read the Corgi (English paperback) edition and pin their citations to it. Unlike von Däniken, and like real scholars, they do cite their sources. A couple of the writers had read the second book ("Return to the Stars" in England).

This is the book to read instead of Wilson's "Crash Go the Chariots" if you want a reasoned demolition of the principal facts that aren't facts, citations that aren't citations, and arguments that aren't arguments in the first von Däniken book. I am not sure whether I want to recommend the anonymous "Was Santa a Spaceman?" but I wish I had said the things they do. (They do use about twelve times as much space as my long-winded commentary.)

Castle is a teacher, Thiering a teacher and clergyman. They have asked Australians with a sound background in various disciplines (archaeology, physics, biblical history, etc.) to read von Däniken's book and comment. They do seem to have missed the fact that von Däniken used German translations—and often early translations—of the Bible and Sumerian tablets, whereas their sources are the result of modern scholarship. But, as H. D. Nicolson points out in the most solid and serious section of the book, writers of this ilk, like the Greek Sophists, are "not so much concerned with truth as with the appearance of truth."

Castle, who reviews the film based on the books (and explains its source quite completely), finds it "expensive, elegant and effective," as I did. Too effective, he says; it is more dangerous than the book because you "see for yourself" what von Däniken and the others merely claim, and are convinced. John Gent, Anglican priest and teacher, points out that to write such a book as "Chariots of the Gods?" all you need is time and a card file. To refute it, you need expertise in a vast number of specialized and obscure fields of learning.

I'll leave you with a couple of quotations. From archaeologist J. B. Hennessey, on some of the things that von Däniken says prove Cheops' pyramid couldn't have been built by the Egyptians: "Von Däniken's 'nonexistent' rope can be seen in quantities in the Cairo and other Museums . . . the (nonexistent) rollers are equally well attested as is the (nonexistent) grain, while the (nonexistent) huts were found by Sir Flinders Petrie to the west of Khephren's pyramid . . . the ancient Egyptians did import wood . . . from at least nine different countries and in large quantities." He gives you six references for that.

And from E. C. B. MacLaurin, another archaeologist who has specialized in Canaanite history and prehistory: "Von Däniken's chief weakness is sheer ignorance."

I wish I'd said that.

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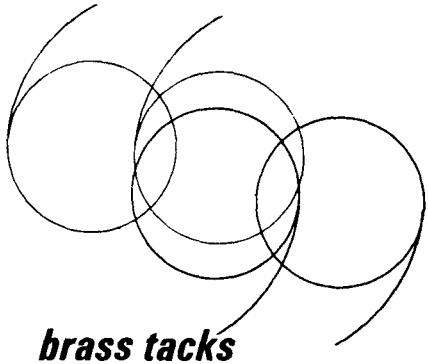

brass tacks

Dear Mr. Bova:

In "Let There Be Light!" (June 1974) Mr. Easton mentioned the difficulty in using the tactile sense as a substitute for hearing in deaf persons. It seems obvious to me that if the tactile cortex is not capable of processing the complex frequency and amplitude breakdown of audio input, then the visual cortex should be capable. A small unit, perhaps strapped to the wrist of a deaf person, with an array of multicolored lights (different colors for different frequencies) varying their intensity according to audio input seems feasible to me.

As it would be necessary for the wearer to look at the unit to "hear," a small electric shock device could be built in to warn the wearer of unusually loud and possibly dangerous noises. Another disadvantage is that it would be difficult to "hear" in bright sunlight. Still, it could be as small as a wristwatch, probably cheaper than a tactile unit and attractive enough that even people with ordinary hearing might wish to wear it as jewelry. Imagine a darkened concert hall or theater filled with multicolored fireflies flickering in time with the music!

BILL BOGEN
9333 E. Jefferson, Apt. 410
Detroit, Michigan 48214

Sounds feasible and possibly even elegant.

Dear Mr. Bova:

As you know, dozens of species on Earth today are in grave danger of extinction. There are only fifty or so California condors left. No Eskimo cranes have been seen since 1965. Many whales are being hunted to extinction. For some species the end seems inevitable: the last one will die, and then that's it.

However, a way may now exist to preserve them. Promising advances in cloning now make it seem quite possible that in a few decades (or even years), any organism may be cloned from a previously-taken sample.

Is any person or organization taking tissue samples of endangered species for this purpose? Surely some Analog reader has the influence to start a "species preservation bank," to prevent the great irony of an extinction that could be avoided.

ERNIE CLARK
119 Larry Drive
Knoxville, Tennessee 37920

This is a doubly worthwhile idea.

Dear Mr. Bova:

I have just finished reading your Editorial, "Teaching Science Fiction," in the June issue. Let me say that I agree with the points that you made wholeheartedly. I teach a course in science fiction myself, and

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after reading your Editorial, I began to wonder if I was even qualified to teach a science-fiction course. I sincerely hope that the Science Fiction Research Association will come up with a set of guidelines for prospective teachers of science fiction . . .

SANDRA DODD
Route 1, Box 399
Charlotte Court House
Virginia 23923
How about it, SFRA?

Dear Mr. Bova:

Re: "Catalyst Run" in the May issue. Let's see more of Jesse Miller! As a one-time trucker I found his projection of a computerized transport system fascinating.

There are some trucking companies that are organized on a highly individualistic, competitive system, while others are organized on a teamwork system. Which system is the more effective? That depends on a person's attitude toward . . . industrial psychology. Perhaps this story will be the "catalyst" to spur on those of us who always *wanted* to write, but "never got around to trying."

SLIM LUBESEDER
Yellowknife, NWT
Canada XOE IHO
Heinlein's First Rule: "You must write!"

Dear Mr. Bova:

In regard to your Editorial, "Teaching Science Fiction," I must say I am a victim of one of those SF courses that you describe. The course covers Ray Bradbury well, but unfortunately that's all it covers well. The only other authors' works we've read are H. G. Wells' "The Time Machine" and Arthur C. Clarke's "Dolphin Island." We've also covered some short stories, all of which aren't worth mentioning here . . .

The originator of the course has never heard of a Hugo award, thinks a Nebula is a drink, and confuses the Marx Brothers with science fiction. When I asked her if she'd ever been to a science-fiction convention, she calmly looked me straight in the eye and said, "A what?" I had to explain to her that a fanzine is not a Westinghouse catalog . . . I'm fed up and feel that I could do a better job with a bad anthology and a piece of chalk.

FRED ANSON
840 S. State College Boulevard
Anaheim, California 92806
As I was pointedly informed at one annual meeting of the SFRA, by the teachers themselves, teachers prefer to work with old and well-known books, because they "know what's in them." In essence, they saddle science-fiction courses with thirty-year-old material because they don't want to do the work necessary to keep up with the field!

Dear Mr. Bova:

I'm weary of hearing (not only in the June Analog Editorial, but also in *Vertex, Genesis,* and the local FM station KPFK) about the decline and fall of *The Starlost* TV series. There haven't been such lamentations, breast-beating and rending of garments since Casey, mighty Casey, struck out. You'd

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think that the only existing copy of a newly-discovered Shakespeare play had been destroyed by vandals.

Among all the unrealistic reasons given for the show's richly-deserved demise, the most naive is your assertion that it stank because it wasn't scheduled in prime time and therefore not enough *money* was spent on it. Since when is a big budget any guarantee of quality? Face it: the show was doomed from the start because of a different kind of poverty—a poverty of imagination built into it by the tired, derivative, near-plagiaristic "concept" ripped-off by its "creator" from Heinlein's "Universe."

And so it came to pass that the mountain labored and brought forth a mouth: that nonstop orifice belonging to science fiction's own answer to the energy crisis, the world's largest vein of natural gas, Harlan (I-Am-All-Mouth-and-Thus-I-Scream) Ellison.

TERRY DIXON
Los Angeles, California

The fact that literally dozens of writers—including Heinlein, Simak, Harrison (and even Bova)—have found interesting material in the "lost starship" theme could be proof that the concept can generate powerful and exciting story content. The original ideas that Ellison put into the show were powerful and stimulating. The TV producers, feeling that since the show would not be on prime time it could not be anything more than kiddie fare, rejected those ideas and brought forth the tapioca pudding that you saw on the screen. Incidentally, Ellison received the Writers Guild Award for his original Starlost *pilot script, as best teleplay for a drama series. That award-winning script was torn to shreds by* The Starlost *crew, and never used.*

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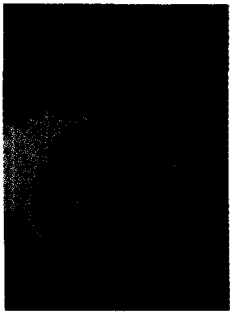

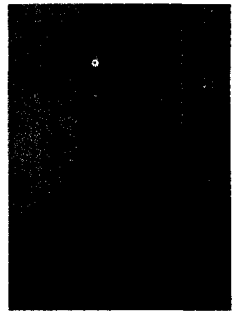

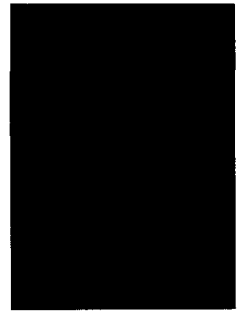

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